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Forest
Service

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Draft Environmental Impact Statement

Flint Foothills Vegetation Management - Volume 2 Appendices

Pintler Ranger District, Beaverhead-Deerlodge National Forest
Granite and Powell Counties, Montana

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Appendix A – Comparison of Proposed Actions

Changes to the Proposed Action since the 2011 Scoping Letter

Table A- 1. Changes to the proposed action since the 2011 scoping letter

Unit #	2011 Scoping Acres/DEIS Proposed Action Acres	Recommended Change	Reason	Decision
Clearcut Salvage (S)				
9S	2/0	Drop unit.	This unit is a small patch of dead trees that were previously left as wildlife leave patch. Will retain the leave patch and drop the unit.	Drop unit. Decision: 08/19/2011
10S	31 /31	Change treatment prescription to commercial thin (10C).	Unit has a Douglas-fir component (unit number remains the same; the alpha code changes to “C”).	Change treatment prescription from salvage by clearcut to commercial thin. Decision 08/19/2011
26S	25/25	Change logging system to all cable	Insufficient volume for tractor logging.	Change to all cable logging. Decision 08/19/2011
36S and 47S	36S: 46 /61 47S: 13/13	Temp road needs to be a specified road. Due to high cost of construction, it’s recommended that the proposal add the road to the transportation system as a maintenance level I road, rather than propose as a temp road, followed by decommissioning. Consider adding on to the unit to log additional areas (14 acres) with cable logging systems.	Due to steep slopes, road needs to be built to specifications. With the specified road, additionally there are opportunities to include salvage harvest of adjacent areas with cable logging systems.	Will propose a spec road, adding it to the transportation system at a maintenance level 1. Added adjacent areas (salvage) that could be logged with cable systems from the spec road. Decision: 08/19/2011
42S	31 /31	Change to commercial thin (42C).	Unit has a Douglas-fir component (unit number remains the same; the alpha code changes to “C”).	Change treatment prescription from salvage by clearcut to commercial thin. Decision 11/04/2011
43S	43S: 20/11	Split unit so area south of section line is	Unit has a Douglas-fir component.	Split unit into two treatments;

Unit #	2011 Scoping Acres/DEIS Proposed Action Acres	Recommended Change	Reason	Decision
	81C: 0/9	changed to commercial thin (81C).	Southern portion of unit should be commercial thin (unit number remains the same; the alpha code changes to "C" for the commercial thin area).	part salvage and part commercial thin. Decision 08/19/2011
44S	20/31	Expand unit boundary to include all operable acres (to RCA).	Additional lodgepole pine salvage opportunity.	Expand unit. Decision 08/19/2011
67S	33/33	Change to commercial thin (67C).	Upper portion Douglas fir with lodgepole pine. Only small portion salvage only (unit number stays the same; alpha code changes to "C").	Change treatment prescription, from salvage to commercial thin. Decision: 11/04/2011
68S	38/38	Change treatment prescription to commercial thin (68C).	Douglas fir unit with lodgepole pine salvage (unit number stays the same; alpha code changes to "C").	Change treatment prescription, from salvage to commercial thin. Decision: 11/04/2011
71S	122/122	Change treatment prescription to commercial thin (71C).	Mainly a Douglas-fir unit that will be thinned with some salvage component (unit number stays the same; alpha code changes to "C").	Change treatment prescription, from salvage to commercial thin. Decision: 11/04/2011
73S	0/64	Add new salvage unit (near 52C).	Overlooked opportunity.	Add unit. Decision 08/19/2011
74S	0/74	Add new salvage unit (adjacent to 36S). All of this unit would be cable logged	Overlooked opportunity.	Add unit. Decision 08/19/2011
Commercial Thin (C)				
1C	101/102*	Change treatment prescription to seed tree/w	To plant ponderosa pine. This will favor	Change treatment prescription

Unit #	2011 Scoping Acres/DEIS Proposed Action Acres	Recommended Change	Reason	Decision
		reserves (1ST).	ponderosa pine in the lower elevations (unit number remains the same; the alpha code changes to "ST").	from commercial thin to seed tree with reserves. Decision: 11/04/2011
5C	47/47	Change treatment prescription to seed tree/w reserves (5ST).	To plant ponderosa pine. This will favor ponderosa pine in the lower elevations (unit number remains the same; the alpha code changes to "ST").	Change treatment prescription from commercial thin to seed tree with reserves. Decision: 11/04/2011
6C	13/0	Drop unit.	Heritage site concerns: Heritage Specialist recommends dropping the unit.	Drop Unit: Decision: 09/23/2011
13C	3/0	Drop unit.	The unit was previously a reserve patch and does not have a commercial component.	Drop unit: Decision 08/19/2011
27C	139/139	Change treatment prescription to seed tree/w reserves (27ST).	To favor ponderosa pine and to plant ponderosa if needed. A lot of advanced regeneration in portions. This will have pre-commercial thinning embedded in it for the advanced pockets of regeneration. This will favor ponderosa in the lower elevations (unit number remains the same; the alpha code changes to "ST").	Change treatment prescription from commercial thin to seed tree with reserves. Decision: 11/04/2011
30C	39/39	Change treatment prescription to seed tree/w reserves (30ST).	Unit was logged before and advanced regeneration in cable corridors is being affected by budworm. Relieve pressure off of advanced regeneration from budworm (unit number remains the same; the alpha code changes to "ST").	Change treatment prescription from commercial thin to seed tree with reserves. Decision: 11/04/2011
32C	18/18	Change treatment prescription to seed tree/w reserves (32ST).	This will favor ponderosa pine. Unit was logged before and advanced regeneration in cable corridors is being	Change treatment prescription from commercial thin to seed tree with reserves.

Unit #	2011 Scoping Acres/DEIS Proposed Action Acres	Recommended Change	Reason	Decision
			affected by budworm. Want to interplant ponderosa pine here (unit number remains the same; the alpha code changes to "ST").	Decision: 11042011
34C	78/78	Change treatment prescription to salvage (34S)	Wasn't enough Douglas-fir for a commercial thin; more dead lodgepole pine, so changed to a salvage by clearcut unit.	Change treatment prescription from commercial thin to clearcut salvage. Decision: 11/04/2011
55C	173/175*	No change in prescription or unit boundary; changes due to rounding in GIS	N/A	N/A
63C	73/0	Drop unit.	Unit is not conducive to any treatment prescriptions developed for this project.	Drop unit. Decision:08/19/2011
65C	8/8	Change treatment prescription to seed tree/w reserves (65ST).	Change to seed tree to favor ponderosa pine in the lower elevations (unit number remains the same; the alpha code changes to "ST").	Change treatment prescription from commercial thin to seed tree with reserves. Decision: 11/04/2011
Commercial Thin/Clearcut Salvage (CS)				
6CS	13/14	Change treatment prescription, from 6CS to commercial thin (6C).	Had enough Douglas-fir for commercial thin (unit number remains the same; the alpha code changes to "C").	Change treatment prescription from commercial thin/salvage to commercial thin. Decision: 11/04/2011
7CS	77/0	Drop unit.	From Heritage specialist: There is a large heritage site at the northern end of the unit. Surveys on the southern 1/4 of the unit located mining activity and a cabin. I anticipate finding more historic mining activity as I move northward. I	Drop unit. Decision 08/19/2011

Unit #	2011 Scoping Acres/DEIS Proposed Action Acres	Recommended Change	Reason	Decision
			recommend we drop the unit.	
8CS	13/13	Change treatment prescription to commercial thin (8C)	Had enough Douglas-fir for commercial thin (unit number remains the same; the alpha code changes to "C").	Change treatment prescription from commercial thin/salvage to commercial thin. Decision: 11/04/2011
11CS	13/17	Change treatment prescription to commercial thin (11C) and increase unit size.	Had enough Douglas-fir for commercial thin. Include adjacent opportunities (unit number remains the same; the alpha code changes to "C").	Change treatment prescription from commercial thin/salvage to commercial thin and increase unit acreage. Decision: 08/19/2011.
18CS	5/0	Drop or add onto.	This unit will be less than 5 acres once the Roadside 4 component is taken out. It also has mining sites adjacent to it, and contains old growth. Heritage specialist recommends dropping unit, 09/15/2011.	Drop Unit. Decision:09/23/2011
22CS	16/16	Change treatment prescription to commercial thin (22C).	Had enough Douglas-fir for commercial thin (unit number remains the same; the alpha code changes to "C").	Change treatment prescription from commercial thin/salvage to commercial thin. Decision: 11/04/2011
28CS	13/13	Change treatment prescription to commercial thin (28C).	Had enough Douglas-fir for commercial thin (unit number remains the same; the alpha code changes to "C").	Change treatment prescription from commercial thin/salvage to commercial thin. Decision: 11/04/2011
46CS	79/79	Change treatment prescription to salvage (46S).	More lodgepole pine than Douglas-fir. This unit may look like a seed tree with reserves prescription where there is plentiful Douglas-fir (unit number	Change treatment prescription from commercial thin/salvage to salvage by clearcut.

Unit #	2011 Scoping Acres/DEIS Proposed Action Acres	Recommended Change	Reason	Decision
			remains the same; the alpha code changes to "S").	Decision: 11/04/2011
48CS	48 CS:196 48C: 157 77S: 16 78S: 23	Separate out commercial thin and salvage components. Change to 48C, and add 77S and 78S.	This is a large unit containing lodgepole pine stands that need to be salvaged (unit number for commercial thin remains the same, the alpha code changes to "C"; two new "S" units added).	Change treatment prescription, from commercial thin/salvage to individual commercial thin and salvage by clearcut units. Decision: 11/04/2011
52CS	52CS:136 52S: 94 65C: 18 66C: 24 79S: 31	Separate out commercial thin and salvage components. Expand unit to include area to the northwest on the downhill side of the road. Unit split into four units: 52S, 65C, 66C and 79S.	Standard mitigation is 100 feet for any mining site. Will need heritage survey findings to make final determination on road location. The temporary road location was changed away from the ditch; the Heritage specialist will determine where appropriate to cross the ditches and pursue the approval to do so. Cabin foundation was noted.	Change temp road location. Change treatment prescription, from commercial thin/salvage to individual commercial thin and salvage by clearcut units. Decision: 08/19/2011 11/04/2011
56CS	18/18	Change treatment prescription, from 56CS to commercial thin (56C).	Had enough Douglas-fir for commercial thin (unit number remains the same; the alpha code changes to "C").	Change treatment prescription from commercial thin/salvage to commercial thin. Decision: 11/04/2011
57CS	27/27	Change treatment prescription, from 57CS to commercial thin (57C).	Had enough Douglas-fir for commercial thin (unit number remains the same; the alpha code changes to "C").	Change treatment prescription from commercial thin/salvage to commercial thin. Decision: 11/04/2011
58CS	49 acres	Change treatment prescription to salvage by clearcut (58S).	More lodgepole than Douglas-fir (unit number remains the same; the alpha code changes to "S").	Change treatment prescription from commercial thin/salvage to salvage by clearcut.

Unit #	2011 Scoping Acres/DEIS Proposed Action Acres	Recommended Change	Reason	Decision
				Decision: 08/19/2011
60CS	14/14	Change treatment prescription from commercial thin/salvage to commercial thin (60C).	Had enough Douglas-fir for commercial thin (unit number remains the same; the alpha code changes to “C”).	Change treatment prescription from commercial thin/salvage to commercial thin. Decision: 11/04/2011
Temp road to 80C	N/A	Add 0.2 mi temporary road access to 80CS	Added to reduce adverse skidding in the unit.	Add temp road for 80CS. Decision: 09/23/2011
		Precommercial Thin		
9P	31	Change treatment prescription to commercial thin (80C).	Has commercial timber; was not appropriate for precommercial thinning. New number used for the unit.	Change to commercial thin unit. Decision: 09/23/2011
10P	32	Change to salvage (76S).	This was originally identified incorrectly as a precommercial thin. This unit has commercial-sized trees that are ready to be salvaged. New number used for the unit.	Change to salvage by clearcut unit. Decision: 09/23/2011.
1P, 4P, 5P, 7P, 8P, 13P, 15P, 16P, 18P, 19P, 20P, 22P 29P, 30P	662	Dropped from precommercial thinning. Evaluate potential for commercial component.	Some or all of these units are beyond the need for precommercial thinning, and some may have a commercial component.	Dropped units that were not viable for precommercial thinning. Decision: 09232011
26P	122	Combined PCT units 2P, 3P, 6P, 26P and 21P	Decided units could be combined, 09/15/2011.	Combine 5 precommercial units into one unit. Decision: 09/23/2011
3P, 8P,	647	Added “new” precommercial units. Some of		Add units that were intended

Unit #	2011 Scoping Acres/DEIS Proposed Action Acres	Recommended Change	Reason	Decision
9P, 10P, 14P, 16P, 17P, 20P, 21P, 25P, 27P, 28P, 29P, 30P, 31P, 32P, 41P, 42P, 43P, 45P		these unit numbers are the same as what was used in the proposed action, but the units are different.		to be part of the proposed action Decision: 09/23/2011

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Appendix B – Scoping Comments and the Forest Service Responses; Literature Review

Scoping Comments and the Forest Service Responses

Table B-1 lists 15 comment letters by date received from scoping for the Flint Foothills Project. Letters 1-7 were received in response to scoping for the planned Flint Foothills Environmental Assessment. After it was determined that an Environmental Impact Statement was needed, a second round of scoping letters were mailed. The letters received in response to that second round of scoping begins with number 8 and continues to number 15.

Table B-2 is the summary of all the scoping comments derived from the letters.

Table B- 1. Scoping contacts Flint Foothills Project

Letter #	Date Received	Name
1	7.06.2010	Michael Garrity - Alliance for Western Rockies/Sara Johnson, Native Ecosystems Council
2	7.17.2010	Steve Flynn - Sun Mountain Lumber
3	7.06.2010	Sarah Jane Johnson - Native Ecosystem Council/Michael Garrity - Alliance for the Wild Rockies
4	7.29.2010	Dick Artley
5	7.27.2010	Cliff Nelson, Maureen Connor, Suzanne Browning – Granite County Board of Commissioners
6	8.03.2010	Mack Long - Fish, Wildlife and Parks
7	8.17.2010	Darren Dunham, Royal Outfitters
8	6.02.2011	Usacitizen1
9	6.08.2011	Stan Wilmoth, PhD. Montana State Archeologist/Deputy, SHPO. Montana Historical Society
10	6.09.2011	Dick Artley
11	6.22.2011	Julie A. DalSoglio, Acting Director Montana Office of the United States Environmental Protection Agency.
12	7.05.2011	Michael Garrity - Alliance for Western Rockies/Sara Johnson, Native Ecosystems Council
13	7.06.2011	Sarah Jane Johnson - Native Ecosystem Council/Michael Garrity - Alliance for the Wild Rockies
14	7.11.2011	Carolyn Boyer-Smith – The Shoshone-Bannock Tribe
15	7.21.2011	Robert Ray – Montana Department of Environmental Quality

The following table summarizes the public comments received during scoping and describes how each comment was addressed during the analysis process. The full content of letters and emails are available in the processes section of the project record. Please refer to table B- 1 above to cross-reference the letter number with the person making the comment.

Table B- 2. Scoping comments and the Forest Service Responses for the Flint Foothills Project

Comment/Concern	Letter Number	Response to Comment How Comment was Addressed
General/Support/Nonsupport		
General Comments		
Thank you for the opportunity to comment. Please accept these comments on the Flint Foothills Vegetation Management Project proposal, in response to the scoping notice I received on July 6, 2010 on behalf of the Alliance for the Wild Rockies and Native Ecosystems Council.	1	You are welcome. Thank you for your comment
Please keep us on your list to receive further mailings on the proposal.	1 and 12	Thank you for your interest in the project. You will remain on the mailing list for future notifications.
…please keep me informed on this project	2	Thank you for your interest in the project. You will remain on the mailing list for future notifications.
(AWR) would like to be included in the public involvement process for the planned Flint Foothills Vegetation Management Project. Both NEC and AWR would like to receive hard copies of the NEPA document when it is released for public comment.	3	Hard copies of the NEPA document will be sent to AWR and NEC.
I have read your scoping letter for the Foothills Vegetation Management project. Please consider the following comments and insert a hardcopy in the project file. After receiving the hardcopy scoping package I went to the electronic home page for the Beaverhead Deerlodge NF looking for the electronic copy of the scoping package. It had not been posted. There are members of the public by the thousands nationwide that are interested in commenting on proposed timber sales proposed on their land. Sending a few hundred hardcopy scoping letters excludes these national forest owners. Please post the information by August 1	4	Your comment letter is part of the project file. We're sorry for any inconvenience with respect to locating the 2010 scoping information on the Forest's website. The project was listed on the Schedule of Proposed Activities for the 07/01/2011-09/30/2011 quarterly publication. The link to the Beaverhead-Deerlodge NF Project's page, which included project documents, was provided in the 10/01/2011-12/31/2011 SOPA publication, or could be directly

Comment/Concern	Letter Number	Response to Comment How Comment was Addressed
		accessed through the Forest's website.
When I access the "Resource Management" section, I come to a page that states: "Currently, Timber Management is the only item in this section. We hope to present more information in the future." Timber is not a resource. Timber is a possible use for the conifer trees growing on your forest. There is a multitude of natural resources that exist in the Beaverhead Deerlodge NF. Supervisor Myers, please send me an email with your response to the following question. Why do you choose to highlight "Timber Management" first? Why isn't the date when the information for other resource management projects not shown? When will the date be shown?	4	The Forest's website is updated over time. Currently there are landscape-level assessments and site-specific projects provided under the Resource Management section of the Land and Resource Management Section of the BDNF webpage.
I collectively own the Beaverhead-Deerlodge National Forest. I am joined by 306 million Americans. The CEO and stockholders own the forest too, but any corporate use motivated by profit at the expense of the proper functioning of the natural resources should be disallowed by the Responsible Official. Timber harvest and associated access road construction might be warranted to solve a vegetation problem 3% to 5% of the time on public land. Instead, the Forest Service proposes commercial timber harvest to solve vegetation problems. Most of these so-called vegetation problems are dreamed up by humans to satisfy human needs at the expense of the proper functioning of the natural resources in the forest.	4	Thank you for your comment
Please include me in the mailing list to receive continued updates on the project.	7	Thank you for your interest in the project. You will remain on the mailing list for future notifications.
Thank you for seeing that we received a copy of the revised Flint Foothills Vegetation Treatment proposal.	9	You are welcome. Thank you for your comment.
I thank you for giving me the opportunity to submit scoping comments for the proposed Flint Foothills Vegetation Management project.	10	You are welcome. Thank you for your comment.
We are losing about 200 square miles of our public land to development each week.	10	Thank you for your comment.
Thank you for your attention and time. I look forward to reading the draft NEPA document that responds to my concerns.	10	You are welcome. Thank you for your comment.
Thank you for the opportunity to comment. Please accept these comments on the Flint Foothills Vegetation Management Project proposal on behalf of the Alliance for the Wild Rockies and Native Ecosystems Council. We incorporate our previous scoping comments.	12	You are welcome. Thank you for your comment
Both NEC and A WR would specifically like to request a "hard copy" of the draft environmental impact statement when it is released for public comment.	13	Hard copy of the Draft Environmental Impact Statement will be provided when it is released for public comment.

Comment/Concern	Letter Number	Response to Comment How Comment was Addressed
The Shoshone-Bannock Tribes (Tribes) Heritage Tribal Office (He TO) appreciate, the opportunity to comment on the proposed Flint foothills Project.	14	You are welcome. Thank you for your comment.
Support		
Thank you for the opportunity to provide comment and express our strong support for the Flint Foothills Vegetation Management Project. We are encouraged that the Forest Service is pursuing active resource management and addressing current forest management opportunities The proposed action detailed in the scoping document dated July 2, 20I0 provides an excellent plan to meet environmental, economic and cultural objectives for the citizens of Granite County, Montana, and the United States as a whole.	5	Thank you for your support.
Management actions described in the document are additionally supportive of the identified management priority for the Flint Foothills and Flint Uplands Management Areas as identified in the Beaverhead-Deerlodge Forest Plan (2009). Timber production, livestock grazing and dispersed recreation will all benefit from responsible forest management. However, dynamic and healthy forest resources are beneficial to all resource uses and are not confined to just those listed as priorities for the management area.	5	Thank you for your support.
Again, thank you for this opportunity to express our strong support for the proposed action for the Flint Foothills Vegetation Management Project. It is an environmentally, economically, and culturally responsible plan that addresses forest resource management in an active fashion. We would like to offer our support in any manner that may expedite implementation of the proposed action including acting as an intervener on your behalf if that becomes necessary.	5	Thank you for your support.
We have reviewed the scoping notice for this proposal for vegetation management activities on approximately 5,591 acres within the 44,493-acre project area, located mainly in the Flint Foothills Management Area (MA) with some in the northern Flint Uplands MA. Proposed project actions include harvesting dead/dying lodgepole pine, commercially thinning ponderosa pine and Douglas fir, prescribed burning, and precommercial thinning. We have no specific comments at this time, but we offer the following. As usual, we value your help in getting the message out to timber contractors on the need to contain bear and other wildlife attractants. And that bears are attracted to oil products including machinery lubricants, and can therefore be expected to investigate logging sites. We also note reports in recent years of occasional grizzly bears in the Flints. Please feel free to contact our bear specialist, Jamie Jonkel (phone 406-542-5508; jajonkel@mt.gov) regarding updated grizzly locations for this area. For any fisheries related consultation, please feel free to contact our area fisheries biologists: For Granite County portions of this proposal, Brad Liermann (406-825-5225 at Rock Creek, bliermann@mt.gov), and for Powell County, Jason Lindstrom (406-846-8058 at Deer Lodge, jlindstrom@mt.gov). For general wildlife consultation, please contact area wildlife biologist Ray Vinkey (406-859-1704 at Philipsburg; rvinkey@mt.gov). Thank you for providing the opportunity for Region 2 FWP to comment on this proposal.	6	Project design features (chapter 2, p. 43) directed at containment of wildlife attractants at project work sites are incorporated into the project,

Comment/Concern	Letter Number	Response to Comment How Comment was Addressed
I think the impact on our outfitting operation will be minimal, it may impact some of our hunting in the Gird Ck drainage but we have plenty of country to hunt and I have no problem making adjustments since we have a large area to hunt.	7	Thank you for your comment. The recreation section of the DEIS, p. 355. discloses impacts to outfitter operations in the recreation section. Anticipated effects are a result of timing restrictions, delays, and temporary road or area closures for public safety while treatment activity is occurring. Such effects are site specific and the majority of the general forest area is expected to remain accessible for recreation use as treatments occur over time.
The Watershed Protection Section (WPS) of the Montana Department of Environmental Quality appreciates the opportunity to provide scoping comments on the proposed Flint Foothills Vegetation Management project. The WPS supports the overall purpose and need for the proposed project.	15	Thank you for your support.
Nonsupport		
These are national public lands belonging to every citizen in the usa. they don't belong to the fs. you are a temporary agency. The fs has turned into a truly destructive force. Your actions result in human hospitalization and death. your actions are a disaster for america, not a help The plan needs revision	8	Thank you for your comments. The proposed action has been revised since the scoping letter was published.
EIS Process/Monitoring/Opposing Science/Costs		
EIS Process		
The Forest Service must complete a full environmental impact statement (EIS) for this Project because the scope of the Project will likely have a significant individual and cumulative impact on the environment. Following the list of necessary elements, Alliance has also included a general narrative discussion on possible impacts of the Project, with accompanying citations to the relevant scientific literature. These references should be disclosed and discussed in the EIS for the Project. The Alliance for the Wild Rockies and Native Ecosystems Council (collectively "Alliance") submit the following comments to guide the development of the environmental analysis for the proposal. The Forest Service must complete a full environmental impact statement (EIS) for this Project because the scope of the Project will likely have a significant individual and cumulative impact on the environment. Alliance has	1 and 12	**A**. Standards are addressed through project design features, chapter 2, p. 43 The Forest Plan Consistency Checklist addresses how each standard is met, appendix C. **B.** All reasonably foreseeable future actions are described in table 24. An associated map is

Comment/Concern	Letter Number	Response to Comment How Comment was Addressed
reviewed the statutory and regulatory requirements governing National Forest Management projects, as well as the relevant case law, and compiled a check-list of issues that must be included in the EIS for the Project in order for the Forest Service's analysis to comply with the law. Following the list of necessary elements, Alliance has also included a general narrative discussion on possible impacts of the Project, with accompanying citations to the relevant scientific literature. These references should be disclosed and discussed in the EIS for the Project. I. Necessary elements for project EIS: A.Disclose all Beaverhead-Deerlodge National Forest Plan requirements for logging/burning projects and explain how the Project complies with them; B.Disclose the acreages of past, current, and reasonably foreseeable logging, grazing, and road-building activities within the Project area; C.Solicit and disclose comments from the Montana Department of Fish, Wildlife, and Parks and the U.S. Fish and Wildlife Service regarding the impact of the Project on fish and wildlife habitat; D.Solicit and disclose comments from the Montana Department of Environmental Quality regarding the impact of the Project on water quality; E.Disclose the biological assessment for the candidate, threatened, or endangered species with potential and/or actual habitat in the Project area; F.Disclose the biological evaluation for the sensitive and management indicator species with potential and/or actual habitat in the Project area; G.Disclose the snag densities in the Project area, and the method used to determine those densities; H.Disclose the current, during-project, and post-project road densities in the Project area; I.Disclose the Beaverhead-Deerlodge National Forest's record of compliance with state best management practices regarding stream sedimentation from ground-disturbing management activities; J.Disclose the Beaverhead-Deerlodge National Forest's record of compliance with its monitoring requirements as set forth in its Forest Plan; K. Disclose the Beaverhead-Deerlodge National Forest's record of compliance with the additional monitoring requirements set forth in previous DN/FONSIs and RODs on the Beaverhead-Deerlodge National Forest; L. Disclose the results of the field surveys for threatened, endangered, sensitive, and rare plants in each of the proposed units; M. Disclose the level of current noxious weed infestations in the Project area and the cause of those infestations; N. Disclose the impact of the Project on noxious weed infestations and native plant communities; O. Disclose the amount of detrimental soil disturbance that currently exists in each proposed unit from previous logging and grazing activities; P. Disclose the expected amount of detrimental soil disturbance in each unit after ground disturbance and		provided in appendix D. The past and current acreages of vegetation projects are provided in appendix D. The grazing allotments, including acreages, are discussed in the Range section of the DEIS, p. 343. A GIS query indicates that 204 miles of road have been built within the project area, including roads that are now closed. **C**. MFWP provided comments in response to the Forest scoping effort. Consultation with the USFWS will be conducted concerning project impacts to grizzly bears and westslope cutthroat trout. **D**. Montana Department of Environmental Quality provided comments (letter 15) to the 2011 scoping letter. **E.** No threatened or endangered plants are known to occur on the Beaverhead-Deerlodge National Forest. None were found during project surveys. DEIS, p.113. No threatened or endangered aquatic species are known to occur in the project area, DEIS, p. 310. A biological assessment is being conducted to assess project impacts to grizzly bears **F**. The sensitive plant biological evaluation is incorporated into the DEIS, p.113 and includes the

Comment/Concern	Letter Number	Response to Comment How Comment was Addressed
prior to any proposed mitigation/remediation; Q. Disclose the expected amount of detrimental soil disturbance in each unit after proposed mitigation/remediation; R. Disclose the analytical data that supports proposed soil mitigation/remediation measures; S. Disclose the timeline for implementation; T. Disclose the funding source for non-commercial activities proposed; U. Disclose the current level of old growth forest in each third order drainage in the Project area; V. Disclose the method used to quantify old growth forest acreages and its rate of error based upon field review of its predictions; W. Disclose the historic levels of mature and old growth forest in the Project area; X. Disclose the level of mature and old growth forest necessary to sustain viable populations of dependent wildlife species in the area; Y. Disclose the amount of mature and old growth forest that will remain after implementation; Z. Disclose the amount of current habitat for old growth and mature forest dependent species in the Project area; AA. Disclose the amount of habitat for old growth and mature forest dependent species that will remain after Project implementation; BB. Disclose the method used to model old growth and mature forest dependent wildlife habitat acreages and its rate of error based upon field review of its predictions; CC. Disclose the amount of big game (moose and elk) hiding cover, winter range, and security currently available in the area; DD. Disclose the amount of big game (moose and elk) hiding cover, winter range, and security during Project implementation; EE. Disclose the amount of big game (moose and elk) hiding cover, winter range, and security after implementation; FF. Disclose the method used to determine big game hiding cover, winter range, and security, and its rate of error as determined by field review; GG. Disclose and address the concerns expressed by the ID Team in the draft Five-Year Review of the Forest Plan regarding the failure to monitor population trends of MIS, the inadequacy of the Forest Plan old growth standard, and the failure to compile data to establish a reliable inventory of sensitive species on the Forest; HH. Disclose the actions being taken to reduce fuels on private lands adjacent to the Project area and how those activities/or lack thereof will impact the efficacy of the activities proposed for this Project; II. Disclose the efficacy of the proposed activities at reducing wildfire risk and severity in the Project area in the future, including a two-year, five-year, ten-year, and 20-year projection;		assessment of whitebark pine (candidate species). A biological evaluation and wildlife specialist report has been completed; effects to sensitive and management indicator species is provided in the Wildlife section of the DEIS, pp. 170 and 208. **G**. Project-wide snag densities will not be displayed. FP standards 3 and 4 require snag retention numbers within the proposed harvest units; the FP standard requirements are disclosed and met with the project proposal alternatives. Additionally, with 100% of the lodgepole pine stands affected by mountain pine beetle and pine mortality extensive and continuing, the project-wide snag densities are extensive and increasing. **H**. Road densities are disclosed in the transportation specialist report. They are as follows. Alt 1: before = 2.94 miles per square mile, during = 2.94, after = 2.94. Alt 2: before = 2.94, during = 3.06, after = 2.89. Alt 3: before = 2.94, during = 2.94, after = 2.90. **I, J and K.** Past project and monitoring information is on file at the Beaverhead-Deerlodge National Forest. **L**. The results of the TES plant surveys are provided in the

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JJ. Disclose when and how the Beaverhead-Deerlodge National Forest made the decision to suppress natural wildfire in the Project area and replace natural fire with logging and prescribed burning; KK. Disclose the cumulative impacts on the Forest-wide level of the Beaverhead-Deerlodge National Forest's policy decision to replace natural fire with logging and prescribed burning; LL. Disclose how Project complies with the Roadless Rule; MM. Disclose the impact of climate change on the efficacy of the proposed treatments; NN. Disclose the impact of the proposed project on the carbon storage potential of the area; OO. Disclose the baseline condition, and expected sedimentation during and after activities, for all streams in the area; PP. Disclose maps of the area that show the following elements: 1. Past, current, and reasonably foreseeable logging units in the Project area; 2. Past, current, and reasonably foreseeable grazing allotments in the Project area; 3. Density of human residences within 1.5 miles from the Project unit boundaries; 4. Hiding cover in the Project area according to the Forest Plan definition; 5. Old growth forest in the Project area; 6. Big game security areas; 7. Moose winter range;		Sensitive Plants section of the DEIS, p.113. **M**. The results of the invasive plant surveys and a discussion of the primary cause of presence and dispersal are found in the Invasive Plant section of the DEIS, p.131. **N**. The effects from invasive plant species, and the impacts to sensitive plant populations from project implementation are discussed in the Invasive Plant and Sensitive Plant sections of the DEIS respectively, pp. 139 and 123. **O**. The amount of existing detrimental soil disturbance is provided in the Soils section of the DEIS, starting on p. 239. **P and Q.** The amount of expected soil disturbance in each unit after logging prior to and after mitigation implementation is displayed in the Soils section of the DEIS, p.245. **R**. The analytical data is displayed in the Soils section of the DEIS, starting on p.245. **S**. A timber sale contract is typically 5 years. The prescribed burning is expected to be accomplished over a course of 10 years. **T**. Appropriated funds would be the primary source of funding for proposed non-commercial

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		funding, with the potential of partial funding from RAC funds. **U**. The Forest Plan requires all old growth to be retained; therefore quantifying existing old growth is not required and will not be done. Old growth determination through surveys was done to ensure that existing old growth within proposed units was quantified. These surveys quantified which stands had old growth criteria (Green et al. 2007) at levels that meet old growth definitions so that prescriptions could be designed to retain those stands as old growth after the proposed treatments. **V**. Old growth in proposed treatment units was determined by intensive stand exams following Regional standards. All exams fell within the 95% Confidence Interval. **W**. Historic levels of mature and old-growth forest in the project area are unknown. **X**. Species viability analysis was completed as part of the Forest Plan Revision analysis. The Flint Foothills analysis provides effects analyses and trend determinations for species at spatial scales consisting of the project area and cumulative effects analysis area. **Y**. All of the existing old growth forest would remain after

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		implementation. The only old growth quantified within the project area is within the proposed treatment units, and this old growth would remain after treatment. **Z, AA**. The effects analysis for wildlife discloses the amount of current and post-treatment old growth and mature forest habitat for old growth-associated species addressed in the Wildlife section in the, DEIS starting on p. 181. **BB**. Habitat parameters associated with old-growth and mature habitat analysis are provided in the Wildlife section of the DEIS, starting on page 147. **CC, DD, EE, FF**. The amount of and parameters associated with elk winter range and security areas are disclosed in the Wildlife analysis for the time periods before, during, and after project implementation, in the DEIS beginning on p 208. Moose is not Sensitive or MIS, and is not addressed on the BDNF. **GG**. The Beaverhead-Deerlodge NF Forest Plan was completed in 2009. The first five-year review will be completed in 2014. The Forest Plan Monitoring and Evaluation Strategy directs us to monitor trend for all G1 through G3 sensitive plant species. This monitoring has begun and is continuing to be established for all

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		15 species that meet those criteria. Similarly, monitoring trends of elk and mayfly populations has also begun. **HH and II**. The Forest Service is unaware of any identified hazardous fuels on private lands outside the project area. The purpose and need for the Flint Foothills DEIS (p.4) does not include the need to reduce wildfire risk or severity so these parameters were not assessed. All fuels created by the proposals would be treated and would not be affected by other projects outside of the project area boundary. **JJ and KK**. The Beaverhead-Deerlodge Forest has not made the decision to replace natural fire with logging or prescribed fire although prescribed fire can be used as a tool to meet resource objectives. **LL**. This project complies with the Roadless Area Conservation Rule because it does not propose to build roads or cut timber in any Inventoried Roadless Area. As such, it complies with all Roadless Area Conservation Rule provisions. **MM: I**n general, management actions such as those proposed in the project could improve the resilience of forests to climate-induced increases in frequency

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		and intensity of disturbances such as fire and insect and disease epidemics. Global climate change will alter disturbance regimes because many disturbances have a significant climate forcing (e.g. fire, insects) (Turner 2010). As an example, future climate projections now suggest that fire regimes may change even more dramatically than many scientists had previously imagined (Littell et al. 2009). Within the Beaverhead-Deerlodge National Forest, maintaining a diversity of tree species or dominance types, age or size class diversity within dominance types, and forest density similar to what historic disturbance regimes produced, are considered underpinnings of a resilient forest (USDA 2009a). The impact of climate change on the efficacy of the proposed treatments is not entirely known; however, the proposed treatments are designed to create resiliency within the acres treated such that responses of those acres to future disturbance should allow project area to retain function, structure, identity and feedbacks. **NN**. The effects of the project on carbon storage are addressed in the Vegetation section of the DEIS, p. 98. **OO**. The baseline conditions and expected sedimentation during

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		and after project implementation are discussed in the Hydrology section of the DEIS, starting on page 279. **PP**. Maps 1 and 2: Figure D-1 and D-2 and D-3 are displayed In appendix D. Map 3. This map was not produced. This information is not relevant to any analyses conducted for the Flint Foothills project. Maps 4, 6 and 7. Hiding cover and thermal cover were not analyzed; wildlife secure areas were addressed per Forest Plan direction (figure 26). Appendix F in the DEIS, provides more rationale for the use of wildlife secure areas (Rohrbacher 2011). Moose are not sensitive species or MIS and are not addressed specifically on the BDNF. Map 5: Not provided; see “U” above. Old-growth in the proposed units is displayed in the DEIS, table 28.
Purpose and Need		
“The statement shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action.” Note that this does not say purposes and needs. The Purpose and Need must disclose the primary (a.k.a. underlying) reason for proposing the project.	4	The purpose and need statements have been revised, and are identified in the DEIS, p 4.

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The scoping letter lists 4 reasons for the Foothills Vegetation Management project. If this carries forward into the final NEPA document, you will violate 40 CFR 1502.13 by not identifying the “underlying purpose and need” for the project. If the NEPA document shows multiple purposes and needs, one of them is the REAL reason for the project and the others are anticipated benefits (actual or perceived) that will result when the project is implemented. These effects of implementing the project should be discussed in Chapter 3 of the NEPA document. The Purpose & Need for the Foothills Vegetation Management Project does not Identify the Underlying Purpose and Need. The Purpose and Need is one of the most important sections in ANY NEPA document. There are 2 problems with the Purpose and Need for the Foothills Vegetation Management. First, the P&N headings do not describe the purpose of the treatment. Instead, the P&N headings list the proposed actions. A P&N must have a verb and describe the objective(s) of the proposed treatment. For example: “scarify compacted soil”, “remove leaning trees along well traveled roads”, Gravel the road” etc. Second, the primary reason for the project is not identified. The CEQ regulations for implementing NEPA at section 1502.13 state:	4	40 CFR 1502. 13 states: “The statement shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action.” The regulations do not limit the number of “statements” that comprise the underlying description of the purpose and need for action. The effects of implementing the proposals are described throughout chapter 3 of the DEIS.
40 CFR 1502.13 states: “This section is the heart of the environmental impact statement. Based on the information and analysis presented in the sections on the Affected Environment (Sec. 1502.15) and the Environmental Consequences (Sec. 1502.16), it should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision-maker and the public.” 40 CFR 1502.16 states: “This section forms the scientific and analytic basis for the comparisons under Sec. 1502.14. It shall consolidate the discussions of those elements required by sections 102(2)(C)(i), (ii), (iv), and (v) of NEPA which are within the scope of the statement and as much of section 102(2)(C)(iii) as is necessary to support the comparisons. The discussion will include the environmental impacts of the alternatives including the proposed action, any adverse environmental effects which cannot be avoided should the proposal be implemented, the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented.”	4	40 CFR 1502.13 addresses the purpose and need (DEIS, p.4); CFR1502.14 addresses the alternatives including the proposed action (DEIS, p. 13). Chapter 2 of the DEIS, pp. 13, 19, and 32 describes the no action, the proposed action (alternative 2), and alternative 3. Table 20 p. 56 displays the alternatives in comparative form. This chapter also describes alternatives considered but dropped from detailed analysis (p.54). Project design features and mitigation measure are provided starting on page 43. 1502.15, the affected environment and 1502.16 environmental consequences for each resource, are presented in Chapter 3 of the DEIS.

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Please assure that the natural resources that the P&N will enhance will really be improved.	4	Please refer to the Vegetation section in the DEIS, p. 82, for the effects of the proposal to the vegetation resources within the project area.
It's unethical to include resources that are claimed to be improved by project implementation in the P&N when the project will actually harm these resources.	4	The purpose and need statements address the vegetation management needs within the project area to, in part, reduce densities and create early seral conditions to improve or enhance resiliency to natural disturbances. Refer to the Vegetation section for the beneficial effects to the resources
The EPA generally encourages the inclusion of enhancement of watershed health and improvement in fish habitat and water quality in purpose and need statements for vegetation management projects. Inclusion of watershed health in purpose and need statements promotes inclusion of activities that will reduce sediment delivery to surface waters and improve aquatic health along with forest health. The NOI identifies potential impacts to populations of westslope cutthroat trout from treatment activities, and potential increased runoff and erosion among the issues identified during previous scoping for the project. We encourage the Forest Service, therefore, to consider including in the project purpose and need enhancement of watershed health, fish habitat and water quality. Inclusion of watershed enhancement activities in the project will promote sediment reduction to offset sediment production associated with timber harvest and road construction, which will promote improved water quality, fisheries and watershed conditions, as well as improved vegetative conditions, as a result of the project.	11	The purpose and need is focused on vegetation management. The DEIS explains that while the purpose and need will not be expanded to include enhancement of watershed health, fish habitat and water quality, the project is designed for protection of water quality and aquatic habitat with the implementation of RCA buffers and road BMPs to reduce sediment production and improve road surface drainage.
We encourage consideration of water quality and fisheries protection, restoration and enhancement to be included in purpose and need statements for land management projects; particularly where water quality impaired waters needing restoration may be involved.	11	
Because the proposed project has the potential to affect water quality both positively and negatively, the WPS requests the Forest consider the inclusion of water quality restoration or watershed protection as a purpose and need for the project.	15	The Hydrology section of the DEIS, p. 281 reveals that BMPS will reduce the current sedimentation rate from use of roads.
In closing, we encourage the Forest to consider water quality protection and restoration as one of the primary needs and purposes of the project.	15	
Proposed Action		

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The only criticism may be that the proposed action is somewhat conservative in addressing a serious epidemic. The proposed action of treating 5,591 acres of the total 44,493 acres in the management unit constitutes treating slightly more than 12.5% of the area. Considering that 70% of the lodgepole pine stands within the management unit have been affected by the mountain pine beetle, treating only 12.5% of the area may be just a start to active resource management.	5	Proposed treatment of lodgepole pine stands is actually slightly higher, when the numbers reflect only lodgepole pine dominated stands within the project area. With a total of 18,141 acres of lodgepole pine dominated stands, Alternative 2 proposes to treat 13.3% (6.4% salvage; 6.9% prescribed burn) and alternative 3 proposes to treat 12.5% (5.6% salvage; 6.9% prescribed burn). When existing seedling stands (1,181 acres or 6.5%) are factored in, about 19% of lodgepole pine stands would be in an early seral condition post treatment. In addition, 1,048 acres of sapling sized stands, mostly comprised of lodgepole pine, would be precommercial thinned with either action alternative.
The scoping package indicates that commercial timber harvest will occur on 5,700 acres as part of the Proposed Action.	10	The June 7, 2011 scoping letter identified approximately 5,700 total acres of treatment. Of that total, 2,573 acres involved commercial timber harvest.
Also, the scoping notice did not define why the Forest Service wants to create early seral stages. Why is this important for forest resources? Although various logging acreages (clearcutting and partial logging) were projected in the Forest Plan, there 'vas never any analysis as to why these plans were needed to manage public lands.	13	The purpose and need has been revised (DEIS, p. 4) to describe why early seral conditions are needed. The desired condition for lodgepole pine forests is to maintain a patch mosaic of forested size classes. Forest vegetation structure provides the basis for maintaining or restoring forested ecological communities

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		of sufficient diversity to provide for the viability of the majority of species that occur or make use of the forested types on the BDNF (FP FEIS p. 473).
Alternatives		
Please provide an alternative that eliminates units that have noxious weeds present on roads within units from fire management proposals.	1 and 12	This comment is addressed in more detail in the DEIS p. 130. All proposed treatment units and access routes were surveyed in 2011 for presence of invasive plants. Based on these surveys, there are no prescribed burn units that have invasive plants present along roads within the units, figure 25.
Please include an alternative in the DEIS that includes land management standards that will prevent new weed infestations by addressing the causes of weed infestation.	1 and 12	Required weed prevention practices and measures have been incorporated into the proposed action, DEIS project design features and mitigation measures, p. 43. These practices are Forest Service policy and procedure for any Forest Service project or management action that may result in ground disturbance. The action alternatives have applied the policies and procedures in a site-specific manner to minimize the likelihood of invasive plant establishment and spread during proposed project implementation.
Please include an alternative that excludes burning in the presence of whitebark pine regeneration (consider ‘Daylighting’ seedlings and saplings as an alternative restoration method).	1 and 12	This comment is addressed in more detail in the DEIS, p. 10. Both action alternatives are

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		designed to exclude burning in the presence of whitebark pine.
We request the FS design a restoration/access management plan for project area streams that will achieve recovery goals.	1 and 12	The comment is addressed in the DEIS p.55. This alternative was not analyzed in detail because it does not meet the purpose and need to manage for the specific vegetation types identified in the proposed action and scoping letter. A foreseeable project on the Pintler Ranger District will address which roads, trails, and areas are to be designated for motor vehicle use. This will address access management with respect to motor vehicles in the analysis area, including access to streams. The results of this foreseeable project will be published on a motor vehicle use map, and made free to the public.
What minimum standards are in the BD National Forest Plan to address noxious weed infestations? The failure to include preventive standards violates NFMA because the Forest Service is not ensuring the protection of soils and native plant communities] Additionally, the omission of an EIS alternative that includes preventive measures would violate NEPA because the Forest Service would fail to consider a reasonable alternative.	1 and 12	The Beaverhead-Deerlodge Forest Plan contains a noxious weed objective that states: Prevent, reduce, or eliminate infestations of nonnative or noxious weed species with emphasis on areas where there is a high likelihood of establishment and spread. Manage noxious weeds through Integrated Pest Management as described in the most current Beaverhead-Deerlodge Noxious Weed Control Record of Decision.

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		The project design features and mitigation measures identify weed prevention practices that target limiting the spread of invasive species DEIS, chapter 2
Enclosed are five photos of areas within the Analysis Area that I would like to request be considered for inclusion into the project. They are all on tractor operable ground and most have existing access. Photo #5 outlines areas adjacent to the powerline that bisects the analysis area.	2	Portions of what was submitted are now units 68, 69, 71 and 72. The remainder acres submitted for inclusion were not added due to riparian buffers, heritage sites, inoperable ground, and slopes in excess of 35% with no reasonable access.
Areas adjacent to powelines are within the WUI as described in the Granite County Fire Plan and are priority areas for treatment. There are many other opportunities within the analysis area to include infested stands of timber next to existing roads. I am aware that there is a roadside salvage project proposed for many of the roads but most of the infested areas are much deeper than a roadside treatment would address. The MPB infestation is an on-going event. Timber stands that are green today will likely be infested next year. If it is possible, I would like to see flexibility built into the analysis to be able to add areas at a later date. Perhaps you could define the parameters for adding additional areas along existing roads that become infested that would allow you to address them at a later date. Or, you could include all of the areas containing mature trees adjacent to roads that are likely to be infested in the future and retain the option of deleting them from treatment if they are not infested. Because of the time frame associated with completing NEP A on this project, I believe you need to project the conditions on the ground two years from now. Trees that are dead now will likely be unmerchantable by the time treatments on the ground begin. And high-risk stands with a small amount of current mortality from the MPB will likely be heavily infested by that time. I believe you have the tools to make this projection and I would like to see an Alternative based on this [see comment 1] approach.	2	Any improvement or investment within the project area can be considered WUI itself, but not the area around it. In the Granite County Fire Plan, the power lines that run through the project area are identified as within the WUI. The power company that owns the power line actively maintains the fuels under the line as part of their easement. The fuels adjacent to the line do not pose a risk to the line from wildfire so treatment of those fuels would be a secondary benefit. Currently, 100 percent of the lodgepole pine stands with trees 5 inches d.b.h. or larger have been affected by the mountain pine beetle. All suitable acres were looked at for harvest and presented in the updated

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		proposed action.
Please modify the Proposed Action as it is described in the scoping package….Please do no construct any roads (temp or system) for this sale.	10	Alternative 3 was developed and analyzed in response to this comment. Under alternative 3 no new road construction would occur.
We particularly support monitoring and evaluation and incorporation of principles of adaptive management into alternatives, and strategies that maintain and/or restore watershed condition and water quality to fully support beneficial uses.	11	The DEIS p. 54 explains why additional areas in the Flint Foothills project areas would not be considered for harvest in the future, including the use of adaptive management.
Finally, DEQ notes that project monitoring and adaptive management are integral to good land management. We encourage monitoring and adaptive management be incorporated into all project scoping. In the case of the Flint Foothills Vegetation Management project, DEQ encourages the Forest to include water quality protection and restoration metrics and· development of appropriate monitoring strategies for the various alternatives to help guide and ensure a successful project outcome. At a minimum, the Forest could provide	15	The DEIS p. 54 explains why additional areas in the Flint Foothills project areas would not be considered for harvest in the future, including the use of

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a summary description of a monitoring and adaptive management program that will assure resource impacts and benefits are tracked and that adaptive management is suitably applied in achieving project goals.		adaptive management. Monitoring information has been incorporated into resource sections. Future monitoring for this project is identified in the DEIS p. 53.
If there are local groups focusing on watershed/ecosystem recovery, we encourage the Forest Service to consider including a watershed or ecosystem restoration alternative for detailed evaluation, or at least to include watershed/ecosystem restoration elements in the reasonable alternatives.	11	The purpose and need focuses on vegetation management. It will not be expanded to include watershed or ecosystem restoration.
Please include an alternative that recognizes the high value of the mountain pine beetle in creating wildlife habitat both in the short and long term, and therefore includes management conservation strategies that incorporate the value of these infestations as a resource management strategy, including woodpecker conservation areas. We would like to know where these woodpecker conservation areas will be located in the project area and how they will be designed according to the current best science to ensure that keystone woodpecker species are promoted in this heavily-logged landscape.	13	This comment is addressed in the DEIS p.55. The no action alternative provides for dead and dying lodgepole pine stands across the project area, providing habitat affected by the mountain pine beetle in the short and long term. In addition, since particular parameters for managing wildlife were not provided given the mountain pine beetle epidemic, we did not develop a third action alternative. The Forest Plan does not contain direction to identify woodpecker conservation areas.
The current best science includes recommendations of from 20-25% old growth for forest wildlife, including neotropical migratory birds. Please include an alternative that will provide this level of old growth in the project area.	13	This comment is addressed in the DEIS p. 10. Providing old growth at a prescribed level (e.g., the suggested 20-25% recommendation) can be done if

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		old growth exists at that level in the project area. Old growth stands are compilation of several characteristics that develop with time. The current BDNF Forest Plan recognizes the importance of old growth, and provides the Standard that all old growth will be retained. Both action alternatives adhere to the Standard of retaining all old growth. Additionally, the commercial thinning prescriptions would provide old growth characteristics at an earlier trajectory than the no action alternative; therefore, would elevate the overall old growth percentage in the project area.
Agency Guidance		
The EIS should demonstrate coordination with the U.S. Fish & Wildlife Service (FWS) and Montana Department of Fish, Wildlife & Parks (MDFWP) and help assure that alternatives and analyses address issues such as: impacts to quality and capacity of fish & wildlife habitat, road access and forest openings impact upon habitat, security, displacement, and fragmentation and connectivity of wildlife habitat; maintenance of wildlife movement corridors/trails; impacts upon sensitive species, management indicator species (MIS), and species of special concern (e.g., Townsend's big-eared bat, flammulated owl, black-backed woodpecker, fisher, wolverine, westslope cutthroat trout, etc.); and maintenance of high quality habitats and restoration of degraded habitats. Estimated reductions in impact from mitigation should also be addressed.	11	Montana Department of Fish, Wildlife, and Parks was solicited for comments and provided input for the project. Consultation with USFWS concerning impacts to grizzly bears will be conducted.
Additionally, the WPS encourages the Beaverhead·Deeriodge (B-D) National Forest to consider establishing water quality protection and restoration among the primary metrics for assessing alternatives and outcomes of the proposed project	15	Additional watershed restoration elements would not address the purpose and need of the proposal, DEIS, p.4.
Environmental Impacts		
Our goals for the area include fully functioning stream ecosystems that include healthy, resilient populations of native trout. The highest priority management actions in the project area are those that remove impediments to natural recovery. The task of management should be the reversal of artificial legacies to	1 and 12	The Forest Service shares the same goals. Refer to DEIS, p 274,

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allow restoration of natural, self-sustaining ecosystem processes. If natural disturbance patterns are the best way to maintain or restore desired ecosystem values, then nature should be able to accomplish this task very well without human intervention (Frissell and Bayles, 1996).		Desired Condition section.
It has been well-established that site-specific Biological Evaluations (BEs) or Biological Assessments (BAs) must be prepared for all actions such as this. Further, the Forest Service Manual requires that BEs/Bas consider cumulative effects. The Forest Service Manual states that project BEs/BAs must contain "a discussion of cumulative effects resulting from the planned project in relationship to existing conditions and other related projects" [FSM 2672.42(4)]. "Existing conditions" obviously are the current conditions of the resources as a result of past actions.	1 and 12	BEs and BAs have been prepared as appropriate and summarized in the DEIS.
Please consider using the Stewardship Contracting authority to guide the operational phase of this project. This approach could increase the acres of pre-commercial thinning and address road maintenance and fisheries issues-to name a few within the analysis area.	2	Stewardship contracts are designed as long term (10 year) integrated projects. The condition of the timber commodity, dead lodgepole pine, does not lend itself to a long term contract. By the midpoint of the stewardship contract the value could be greatly diminished.
The project area is very large. It is not clear how direct effects will be measured.	3	Each resource specialist identified relevant spatial and temporal boundaries for their analysis; the boundaries vary for each resource. For example, the soils spatial boundary is the treatment units, and the temporal boundary is the 20-30 years post implementation. For vegetation, the spatial boundary is the project area and the temporal boundary is 50 years post implementation. See the environmental consequences section in Chapter 3 of the DEIS. (. Each resource analyzed the site specific direct impacts (caused by the action and occur at the same time and place,40 CFR 1508.8) and

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		indirect impacts (caused by the action and are later in time or further removed in distance, but are reasonably foreseeable, 40 CFR 1508.8). The cumulative effects analyses considered relevant past, present and reasonably foreseeable future projects identified within their spatial and temporal boundaries. Relevant past vegetation and prescribed burning activities within the project area are identified in the introduction to chapter, 3, Present and reasonably foreseeable actions in the project area are identified in table 24 of the DEIS and displayed in D-4 in appendix D. Projects outside of the project area are identified in the resource analysis sections, where relevant to the analysis. The Forest Service Handbook (FSH) 1909.10, section 15.2 addresses bounding. It states: “Spatial and temporal boundaries are the two critical elements to consider when deciding which actions to include in a cumulative effects analysis. Spatial and temporal boundaries set the limits for selecting those actions that are most likely to contribute to a cumulative effect. The effects of those actions must overlap in space and time for there to be potential cumulative effects.”

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		Section 15.2a states: "Spatial boundaries define the affected area for each resource indicator. The affected area is the area in which a specific resource may be affected by management actions; whether they are past, present, or future. Affected areas can vary in size by resource and by the type of effect that may occur."
The Final EA or FEIS must include an MOU from the USFWL. On January 10, 2001, President Clinton signed E.O. 13186, which described the responsibilities of federal agencies to protect migratory birds. One of the requirements of E.O. 13186 is that ``Each Federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations is directed to develop and implement a Memorandum of Understanding with the Fish and Wildlife Service that shall promote the conservation of migratory bird populations."	4	Migratory birds as related to the MOU with the USFWS are evaluated in the wildlife report, and summarized in the Wildlife section of the DEIS p.231.
I have seen the job that can be done with timber harvesters and forwarder type machines and for what it is worth, I think it leaves the mountain in better shape than the traditional skidders do.	7	All harvest methods are being considered in order to meet forest plan standards for soil disturbance. The most economically efficient harvest methods will be utilized during treatment while maintaining forest plan standards.
In accordance with EPA responsibilities under NEPA and Section 309 of the Clean Air Act, EPA will review the draft EIS prepared for this proposed project. EPA's review will include evaluation of the anticipated environmental impacts as well as the adequacy of the EIS in meeting procedural and public disclosure requirements of NEPA.	11	Thank you for your guidance and comments. The Air Quality section of the DEIS, p.101, discloses how Federal Land Managers participate in the Smoke Management Program.
At this early stage in project planning we are transmitting EPA's general EIS guidance and scoping comments for this type of project for your consideration (see enclosed).EPA's intent is to promote full public disclosure of all foreseeable direct, indirect, and cumulative environmental impacts and mitigation, and consistency with environmental and public involvement requirements of State and Federal laws, Executive Orders and policies. We hope this will lead to an improved decision-making process for selecting among alternatives.	11	Thank you for your guidance and comments

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The twin goals of the National Environmental Policy Act (NEPA) to consider environment effects and inform the public can only be met with clear disclosure of effects of proposed actions on the environment. Our experience has shown that when environmental concerns are thoroughly evaluated, the EIS is a more meaningful document that will lead to better decisions.	11	The environmental effects are disclosed within the resources sections in Chapter 3 of the DEIS
If watershed restoration work will be committed to with the project decision that should be clearly stated. If watershed restoration work is to be carried out only as available funding allows, the potential funding source and likelihood of funding or priority and estimated timetable for implementation should be identified.	11	The alternatives do not include explicit restoration work. Project design features that improve environmental conditions (i.e. best management practices) and mitigation measures (i.e. soil subsoiling) are required components of the commercial timber sale actions associated with salvage by clearcutting, commercial thin seed tree harvest. These activities would be funding through either the timber sale contract or appropriated funding.
Also, if there are any proposed nearby actions or adjacent developments that are closely related to the proposed action it would be appropriate to analyze and discuss those related developments as a connected action (40 CFR 1508.25).	11	No connected actions were identified. Per 40 CFR 1508.25: Actions are connected if they: (i) Automatically trigger other actions which may require environmental impact statements; (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously ;(iii) Are interdependent parts of a larger action for their justification.
Cumulative Effects		
Even though ecological restoration is not the project's priority, the NEPA document must at least identify all the existing ecological liabilities caused by past management actions. This includes poorly located or poorly maintained roads, high-risk fuel situations caused by earlier vegetation manipulation projects, wildlife security problems by open motorized roads and trails plus those that are closed but violated—and include all those impacts in the analyses.	1 and 12	The resource information provided in the Affected Environment narratives in Chapter 3 of the DEIS includes the effects of relevant past actions that may still be contributing effects to the

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		resource and therefore are considered as part of the existing condition. Road maintenance and improvement is discussed in the Transportation section of the DEIS, p. 110. Wildlife secure areas and wildlife security areas are address in the Wildlife section of the DEIS p. 155. Because the purpose and need does not contain a “fire risk” component there is not a fuels section of the DEIS, though, all fuels accumulations as a result of past activities have been treated. Since existing conditions are results of past actions, any possible high-risk fuel situations caused by earlier vegetation manipulation were not identified.
Please define the cumulative effects of various other projects on the BDNF that are planned that will also increase noxious weed infestations. We would like to know the cumulative expected increase in noxious weeds from all currently-planned and proposed logging and burning projects on the Forest, and what the impacts to wildlife will be.	3	Table 24 identifies all of the known present and reasonably foreseeable actions relevant to spatial and temporal boundaries associated with the cumulative effects analyses for the Flint Foothills Project. These boundaries do not encompass the BDNF. No other future vegetation (logging) or prescribed burning proposals are identified. The invasive plant analysis in the DEIS p. 139, and the wildlife analysis (p. 143) under each individual habitat and species

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		describes the cumulative effects from relevant projects.
Cumulative impacts of roads and past logging is a huge negative on this landscape. Please address all the factors that these old roads and harvest units that are degrading wildlife habitat, including for big game, forest raptors, neotropical migratory birds, old growth species, species dependent upon snags, and Montana species of concern.	13	Past road construction and timber harvest are identified as contributing to the existing condition for a number of wildlife species analyzed in the Wildlife section of the DEIS p. 143
Monitoring		
For every project proposal, it is important that the results of past monitoring be incorporated into planning. All Interdisciplinary Team Members should be familiar with the results of all past monitoring pertinent to the project area, and any deficiencies of monitoring that have been previously committed to. For that reason, we expect that the following be included in the NEPA documents or project files: • A list of all past projects (completed or ongoing) implemented in the proposed project area watersheds. • The results of all monitoring done in the project area as committed to in the NEPA documents of those past projects. • The results of all monitoring done in the proposed project area as a part of the Forest Plan monitoring and evaluation effort. • A description of any monitoring, specified in those past project NEPA documents or the Forest Plan for proposed project area, which has yet to be gathered and/or reported.	1 and 12	A list of past vegetation and prescribed burn projects is provided in table 21, table 22and table 23 at the beginning of chapter 3. Past project information and monitoring information relevant to the resource analyses has been incorporated into resource reports and summarized in the DEIS. Past project and monitoring information is on file at the Beaverhead-Deerlodge National Forest.
Please disclose the names of all other past projects (implemented during the life of the Forest Plan) whose analysis area(s) encompass the areas to be “treated” under this proposal. Please disclose if the FS has performed all of the monitoring and mitigation required or recommended in any NEPA documents, and the results of the monitoring.	1 and 12	The Beaverhead-Deerlodge NF Forest Plan was completed in 2009. Roadside 4 is the only other vegetation project which is occurring within the Flint Foothills project area. Roadside 4 has not been completed, so whether or not all mitigation and monitoring has occurred is unknown at this time.
What long term monitoring of weed populations is proposed?	1 and 12	Noxious weed infestations within the Flint Foothills project area will continue to be managed into the

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		reasonably foreseeable future using an integrated pest management approach that is consistent with control methods described in the Beaverhead-Deerlodge National Forest Noxious Weed Control Record of Decision. Treatment implementation and effectiveness monitoring of these infestations will occur on an annual basis by district weed control crews and be reported in the Forest Service's Activity Tracking System (FACTS) database consistent with Forest Plan Monitoring Direction.
Monitoring (Is pre- and post-project monitoring proposed?).	11	Pre- project data is gathered through a combination of formal surveys and walk though examinations. Specific post-project implementation monitoring items are identified in the DEIS, p.53. Forest Plan Monitoring and Evaluation is discussed in the Forest Plan, pp. 271-280. Typically, each timber sale is reviewed for implementation and effectiveness of project design features and mitigation measures, as well as resource issues important to the individual sale.
The EPA also recommends consideration of a biological component, such as rapid bioassessments using macroinvertebrates, in a monitoring program	11	The B-D Forest Plan has identified the mayfly *Drunella doddsi* as a management indicator species, is addressed in the Aquatics section of the DEIS, p. 318, and is included in the Forest Plan Monitoring and

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		Evaluation Strategy, FP, p. 275.
Opposing Science It is our intention that you include in the record and review all of the literature and other incorporated documents we've cited herein. Please contact us if you have problems locating copies of any of them.	1 and 12	The resource specialists working on this project have been provided and reviewed the literature provided by commenters and incorporated it to the extent that it is applicable to the site-specific environmental analysis documented in this DEIS. Documentation of literature reviews is provided in the DEIS, appendix B table B-2.
The Science Statements Contained in the Opposing Science Attachments are Best Science. You will notice several attachments to this comment letter. These attachments contain statements (and links to the statements) written by biological scientists indicating the damage that will be inflicted to the natural resources of the forest when and if the Foothills Vegetation Management project is implemented. Please keep in mind that the Responsible Official must discuss opposing science submitted by the public. The courts have shown that 40 C.F.R. § 1502.9(b) is not trivial. This discussion will explain to the public why the project treatments are inconsistent with opposing science, or how the project complies with opposing science. Appendix A of these comments contains links to 4 opinions handed down in federal court against the Forest Service and BLM in instances where the Responsible Official failed to respond to opposing science. Appendix A also cites the CFR that requires these agency discussions of opposing science. The law also requires the Responsible Official to place their opposing science responses in the final EIS or EA for the general public to read. This provides the public with some insight into the rationale and data used by the Responsible Official to make the final Decision. The scoping letter for the Foothills Vegetation Management project indicates that the following treatments will occur. Timber Harvest: approximately 2,322 acres Road Construction miles: 7 miles of temporary road Prescribed Burning: 2,230 acres The Responsible Official's Final DN or ROD Must be Guided by and Comply with Best Science. Please see the court precedent and direction below *(in literature review).*	4	The resource specialists have reviewed the literature provided by commenters and incorporated it to the extent that it is applicable to the site-specific environmental analysis documented in this EIS. Documentation of the literature reviews is provided in the DEIS, appendix B, table B-2 All literature used in the analysis is properly cited.

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Indeed, Forest Service projects must be consistent with and based on best science. Please see the court precedent and direction below. “The 1982 forest planning regulations at 36 C.F.R. Part 219 were superseded in November 2000, when new regulations were promulgated. 65 Fed. Reg. 67,568 (Nov. 9, 2000). Under the transition provision of the 2000 regulations, the Forest Service was required to consider the "best available science" when implementing site-specific projects within a forest plan. 36 C.F.R. 219.35(a) (2001).” Source: The Ecology Center, Inc., v. United States Forest Service United States Court of Appeals, Tenth Circuit, June 29, 2006 An Appeal from the United States District Court for the District of Utah (D.C. No. 2:03-CV-589-TS) http://caselaw.lp.findlaw.com/scripts/getcase.pl?navby=search&case=/data2/circs/10th/ 054101.html “The purpose of this interpretative rule is to clarify that, both for projects implementing plans and plan amendments, paragraph (a)’s mandate to use the best available science applies.” Source: Federal Register / Vol. 69, No. 188, page 58056 Wednesday, September 29, 2004 Rules and Regulations http://www.fs.fed.us/r1//projects/plan_rule/intrpretative-rule.pdf Since 1992 Forest Service leaders and spokespeople have publically stated that Forest Service projects will be grounded in best science. 40 C.F.R. § 1502.9(a) requires the Responsible Official to disclose any dissenting scientific views in draft EISs and pre-decisional EAs, An excerpt from Friends of the Earth v. Hall , 693 F. Supp. at 924 states: “Where scientists disagree about possible adverse environmental effect, the EIS must inform decision-makers of the full range of responsible opinion on the environmental effects.” Where the agency fails to acknowledge the opinions held by well respected scientists concerning the hazards of the proposed action, the EIS is fatally deficient. The FEIS and FSEIS text failed to disclose the opposition of what must be acknowledged as credible, reliable scientific sources. Here again, the court concludes that based on the circumstances of this case the ‘appropriate point’ to disclose and address these ‘opposing views’ was in the body of the EIS, rather than the comments and response section.” If the Responsible Official chooses to reject opposing scientific views by claiming that they were “not responsible” and/or the source of the opposing view is not “credible” or, “reliable’, please provide the name, education and experience of the Forest Service employee(s) who made these conclusions. When the proposed project ignores or is inconsistent with opposing scientific views, I ask the Responsible Official to cite science literature that refutes the opposing science and supports the proposed project treatment. The Timber Removal Process Damages the Proper Functioning of Several Natural Resources in the Forest. The proposed Foothills Vegetation Management project will harvest timber on 2,322 acres. The Forest Service frequently tells the public that the timber harvest will either; Restore the natural resources of the		

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forest in the project area, or Enhance the health of the forest in the project area, Best science tells us otherwise. Please see Opposing Science Attachment #1. The science literature that supports the proposed project treatments should be written by unbiased, independent scientists with nothing to gain if the project is implemented and nothing to lose if the project is withdrawn If you decide to redesign this project to comply with "best science," your current project proposal will disappear. A new project proposal must pass through the NEPA process again starting with a new scoping letter. Please send me your new scoping letter. Responsible Officials must respond individually to each opposing scientific statement. These responses MUST (emphasis added) be contained in the body of the final EIS or EA. *The links to the complete opinion are included in the literature review*. League of Wilderness Defenders et al. v. Elaine Marquis-Brong. In the United States District Court for the District of Oregon, Judge Ancer L. Haggerty,Civil No. 02-75-HA. April 18, 2003, League of Wilderness Defenders et al. v. United States Forest Service. In the United States District Court for the District of Oregon, Judge Ancer L.Haggerty, Civil No. 04-488-HA. November 19, 2004, and Blue Mountains Biodiversity Project et.al v. Blackwood, 161 F.3d 1208, 1211 (9th Cir.1998). Betty B. Fletcher, circuit Judge. Appeal from the United States District Court for the District of Oregon Ann Aiken, District Judge, Presiding. Center for Biological Diversity v. U.S. Forest Service, 349 F.3d 1157 (9th Cir. 2003). Donald C. Pogue, circuit court Judge. Appeal from the United States District Court for the District of Arizona, Robert C. Broomfield District Judge Presiding. Friends of the Clearwater et al. v. D. Robert Lohn et al., In the United States District Court for the District of Idaho, Judge Edward J. Lodge, CV04-384-C-EJL, March 31, 2005. This requirement is explained in detail in the complete opinions. Links to the complete opinions are shown for each court case. In each court case the judge ruled for the plaintiff. I am not surprised that the USFS was the defendant in 4 out of 5 decisions. In reading the full text of the 4 court opinions some things will become clear: 1) If the Forest Service attempts to discredit any opposing science statement, they must cite convincing, unbiased, independent science refuting the opposing science conclusion. 2) If the Forest Service attempts to avoid a detailed response to the adverse ecological effects discussed in the opposing science by claiming to have applied specific mitigation treatments, the USFS must include citations explaining the mitigation effectiveness under similar circumstances. 3) The Forest Service cannot attempt to avoid a detailed response to the adverse ecological effects discussed in the opposing science by claiming that the science conclusions were based on another project at another time in another area. In the vast majority of cases, the scientists that authored the opposing science		

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statements intended that their statements apply anywhere that a similar treatment is proposed. For the USFS to prove otherwise, they must dissect the opposing statement to find wording that it applies in only one location. 4) If the Forest Service attempts to avoid a detailed response to the adverse effects discussed in the opposing science by claiming they have followed forest plan direction, the USFS must cite the specific forest plans sections used (and FP page(s) and describe past situations similar to the one at hand where the application of forest plan direction minimized the impact of the treatment and for how long. 5) Unsubstantiated Forest Service's statements of agreement or disagreement with the opposing science is irrelevant. The law requires the USFS to respond to opposing science. If the USFS believes that the opposing science is untrue, then the USFS must explain why it is untrue and cite science on the same subject that is true. Please indicate a) the individual(s) who disagree with the opposing science and their education/experience and c) the reason for the disagreement. If the Responsible Official determines that the opposing science is not valid, the Responsible Official should disclose the employees who made the determination and the basis for their conclusion. This commenter will submit this information to the scientist who made the opposing science statement and the scientist will respond to the individuals on the forest. In most cases, the opposing science daylights the adverse ecological effects of proposed USFS treatments. Of course the Responsible Official does not want such information to be disclosed publically. Thus, they will use the 5 excuses listed above to convince the public that they need not respond. The CFR clearly intends for the Responsible Official to describe why the opposing science was or was not considered in the project design. Addressing the opposing science is not a "we agree" and "we don't agree" exercise! As the opposing science shows, there are no exceptions. Every commercial timber sale inflicts major long-term harm to the forested ecosystem within the cutting units. Some Forest Service line-officers deny that there will be adverse effects and others will do anything to hide the adverse effects. A Federal judge will recognize both. If the opposing science was used, then the final NEPA document should provide the NEPA document pages with the citation to the opposing science literature. Forest Service Responsible Officials must Treat the National Forests with Care and Manage this Land that Belongs to the Public According to the Wishes of the Majority of Owners. Attachment #13 displays the results of 18 statistically significant nationwide polls *(see literature review)*. The 18 poll results indicate that an average of 71% of the respondents oppose logging in national forests. This the opposition percentage ranges from a low of 60% to a high of 94%. Please include the results of these 18 polls in the final EA. Such information is needed for the public reader of the EA to put the project in perspective and determine the tradeoffs of timber harvest vs. the need for		

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undeveloped public land. The mandate of the U.S. Forest Service is to administer the national forests owned by 306 million Americans to assure their conservation and protection. They are managed to assure that an unimpaired landscape will be available for future generations to enjoy. As the future decades pass and the population will increase. Undeveloped land will become priceless to the majority of Americans seeking to escape the stressful conditions that exist in society. This need is reflected by the majority of Americans today. The vast majority of Americans object to commercial logging of their national forests If there are polls/surveys or other sources available showing that the majority of Americans approve of commercial timber harvest in their national forests, please include the results of these polls in the final EA. The Responsible Official MUST Address the Opposing Science Submitted by the Public in the Final NEPA Document The law is clear: 40 C.F.R. § 1502.9(b) requires that: “The agency shall discuss at appropriate points in the final statement any responsible opposing view which was not adequately discussed in the draft statement and shall indicate the agency's response to the issues raised.” Source: http://ceq.hss.doe.gov/nepa/regs/ceq/1502.htm#1502.9 Note that agencies are not allowed to pick and choose scientists. To reject a scientific statement, the Forest Service must provide a convincing argument that the opposing science statements are not responsible or irresponsible. Attempting to reject an opposing science statement by claiming it came from literature that has not been peer reviewed does not indicate that the scientist is irresponsible. Attempting to reject an opposing science statement by claiming that the scientist who authored the statement is not recognized or well respected does not indicate that the scientist is irresponsible. Opposing science statements are attached to this comment letter. Each science attachment describes statements made by Ph.D. biological scientists (mostly college professors) that explain why actions identical to those proposed in this project will 1) harm the natural resources in the project area, and/or 2) will not accomplish one or more objectives described in the Purpose and Need. Based on the opposing science statements contained in the attachments in this letter, the Proposed Action for this project does not comply with bestscience. Indeed, the Forest Service has publically announced an interpretative rule telling the public that their projects to be consistent with best science. “This uncertainty has affected the ability of the Forest Service toutilize fully the provisions of § 219.35 paragraph (a) to consider the best science available in plan amendments and project decision making. For example, while population data have been held to be required for management indicator species under the 1982 rules, other tools often can be useful and more appropriate in predicting the effects of projects that implement a land management plan, such as examining the effect of proposed activities on the habitat of specific species; using information identified, obtained, or developed through a variety of methods, such as assessments, analysis, and monitoring results; or using information obtained from other sources such as State fish and wildlife agencies and organizations such as The Nature Conservancy. The purpose of this interpretative rule is to clarify that, both for projects implementing plans and plan amendments, paragraph (a)’s mandate to use the best available science		

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applies." Federal Register / Vol. 69, No. 188, page 58056 Wednesday, September 29, 2004 Rules and Regulations http://www.fs.fed.us/r1//projects/plan_rule/intrpretative-rule.pdf Forest Service leaders and spokespeople have emphasized this direction by promising to the public that all (emphasis added) Forest Service projects will be grounded in best science. Please see Attachment #15.		
Please see the attached Region 1 report on how (in) accurate canopy cover mapping is under the Forest Service's VMAP system. The Northern Region (R1) of the United States Forest Service (USFS) is responsible for managing vegetation for a variety of uses while maintaining the integrity of ecosystem function over regional and local scales. Effective resource planning, analysis and monitoring strategies, in turn, require reliable, consistent and continuous existing vegetation data products. In meeting this need, the R1 Geospatial Group has recently produced the attached vegetation map product, in pdf format, called R1- VMap. It is a spatially explicit, thematic, polygon-based product derived from remotely sensed data that contains information about the extent, composition, and structure of vegetation across National Forest System land in R1. Thank you for your continued attention to these concerns. The results of the report calls into question if the Forest Service is complying with NFMA and NEPA. Please respond to this report. Thank you for your continued attention to these concerns.	12	VMap is a multi-level geospatial database used to produce map products: lifeform, tree canopy cover class, tree diameter and tree dominance type for forested types and non-forest map classes for grassland and shrubland vegetation communities. VMap is a remote sensing derived product, using a combination of satellite imagery and airborne acquired imagery. The resulting imagery is aggregated into spatially cohesive polygons, from which a small sample are then examined through aerial photo interpretation and field data collection to determine their composition. This small sample was then used to give unsampled polygons labels based on an analysis of the sampled polygons. The draft map products were then field verified with appropriate changes made to the labeling algorithms. The Beaverhead-Deerlodge data was field verified over two field seasons. Additional project level field verification and adjustments were made for the Flint Foothill project-level analysis, and are reflected in the vegetation analysis. (Brown and Barber

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		2011)
Rational for the Decision		
Please explain the rationale used by the Responsible Official when determining that the positive effects claimed to result from the Foothills Vegetation Management project are more important than the wishes of the public. Include this explanation in the EA. The most important thing to remember when designing projects is the publically owned national forests are not places to give resource extraction corporations opportunities to generate profits.	4	The Flint Foothills project addresses goals and objectives in the Forest Plan, which includes utilizing forest products, See the purpose and need for action, and associated Forest Plan goals and objectives, DEIS p. 4.
Costs		
Please evaluate all of the costs and benefits of this project. Please include a detailed list of all the costs to the agency and the public.	1 and 12	All agency financial costs and benefits are addressed in the Economics section of the DEIS, p. 397, detailed in tables and used in a financial efficiency analysis. Other non-market costs and benefits can be ascertained by reviewing all sections of the DEIS.
It is not clear that salvage harvest will be economical, even though this is stated as one purpose of the project. If this sale -will cost the public money, this should be clearly identified and noted in the purpose and need of the project. Otherwise, the rationale for logging is misleading the public.	13	The results of the financial efficiency analysis allow a present net value comparison of the costs to the government versus the expected revenues based on current plans to harvest in the near future. This is split for the reader into a present net value of the timber harvest alone and a present net value of all activities, including timber harvest and other project activities.
Vegetation Management EPA General Guidelines		

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In regard to vegetation management, EPA generally favors understory thinning from below, slashing and prescribed fire treatments for managing vegetation to reduce fuels and fire intensity, as well as address forest insect, disease and other forest health issues, with retention of la large, healthy, fire resistant trees, particularly retention of declining tree species (e.g., Ponderosa pine, whitebark pine, aspen), and retention of adequate snags and woody debris to maintain wildlife habitat and soil productivity.	11	This project does not include a purpose and need for reducing fuels or fire intensities, nor does it include a purpose and need for forest insect, disease and other forest health issues with its proposed actions, DEIS, p.4. However, the proposed treatments (thinning and prescribed fire) in lower elevations are designed to thin from below, with the prescription of retaining large trees, especially ponderosa pine. Aspen and whitebark pine would be retained where they occur in all proposed treatments. Additionally, FP standards for snags and downed woody debris for both wildlife habitat and soil productivity would be met.
Vegetation – Noxious Weeds/Invasive Plants/Herbicide Use		
Noxious Weeds/Invasive Plants		
Please address the ecological, social and ascetic impact of current noxious weed infestations within the project area. Include an analysis of the impact of the actions proposed by this project on the long and short term spread of current and new noxious weed infestations. What treatment methods will be used to address growing noxious weed problems? What noxious weeds are currently and historically found within the project area? Please include a map of current noxious weed infestations which includes knapweed, Saint Johnswort, cheat grass, bull thistle, Canada thistle, hawkweed, hound's-tongue, oxeye daisy and all other Category 1, Category 2 and Category 3 weeds classified as noxious in the MONTANA COUNTY NOXIOUS WEED LIST.	1 and 12	See the Invasive Plant section of the DEIS starting on p. 129 for the existing condition, desired condition, environmental consequences of this project on invasive species; included is a, map of invasive species found within the Flint Foothills project area. Treatment of noxious weeds will be an ongoing activity within the Flint Foothills project area and will be consistent with direction found in the Beaverhead-Deerlodge Noxious Weed Control Record of Decision (2002).

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State-listed Category 2 noxious weed species yellow and orange hawkweeds are recently established (within the last 5 to 10 years) in Montana and are rapidly expanding in established areas. They can invade undisturbed areas where native plant communities are intact. These species can persist in shaded conditions and often grow underneath shrubs making eradication very difficult. Their stoloniferous (growing at the surface or below ground) habit can create dense mats that can persist and spread to densities of 3500 plants per square mile (Thomas and Dale 1975). Are yellow and orange hawkweeds present within the project area? Please address the cumulative, direct and indirect effects of the proposed project on weed introduction, spread and persistence that includes how weed infestations have been and will be influenced by the following management actions: road construction including new permanent and temporary roads, and skid trails proposed within this project; opening and decommissioning of roads represented on forest service maps; ground disturbance and traffic on forest service template roads, mining access routes, and private roads; removal of trees through commercial and pre-commercial logging and understory thinning; and prescribed burns. What open, gated, and decommissioned Forest Service roads within the project area proposed as haul routes have existent noxious weed populations and what methods will be used to assure that noxious weeds are not spread into the proposed action units?	1 and 12	Yellow and orange hawkweeds were not found during the 2011 weed inventory, Invasive Plant section of the DEIS, pp. X-X The cumulative, direct and indirect effects were discussed on pp. 137-139 under alternative 2 – proposed action. Invasive species were mapped in 2011. Please see the map, figure 25 on page 133 for current invasive species locations along roads. Project design features and mitigation measures have been integrated into the proposed action to limit the spread of invasive species, DEIS p. 43. In addition, in accordance with the Beaverhead-Deerlodge National Forest Noxious Weed Control EIS (2002), treatments of existing invasive species infestations would continue to occur on an annual basis with an integrated pest management approach.
Noxious weeds are not eradicated with single herbicide treatments. A onetime application may kill an individual plant but dormant seeds in the ground can still sprout after herbicide treatment. Thus, herbicides must be used on consistent, repetitive schedules to be effective. What commitment to a long-term, consistent strategy of application is being proposed for each weed infested area within the proposed action area?	1 and 12	Invasive species infestations within the Flint Foothills project areas will continue to be managed into the reasonably foreseeable future using an integrated pest management approach that is consistent with control methods described in the Beaverhead-Deerlodge National Forest Noxious Weed Control Record of Decision (2002). Treatment

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		implementation and effectiveness monitoring of these infestations will occur on an annual basis by district weed control crews and be reported in the Forest Service's Activity Tracking System (FACTS) database consistent with Forest Plan Monitoring Direction.
The scientific and managerial consensus is that prevention is the most effective way to manage noxious weeds. The Forest Service concedes that preventing the introduction of weeds into uninfested areas is "the most critical component of a weed management program." The Forest Service's national management strategy for noxious weeds also recommends "develop[ing] and implement[ing] forest plan standards . . ." and recognizes that the cheapest and most effective solution is prevention Which units within the project area currently have no noxious weed populations within their boundaries?	1 and 12	The presence of invasive species within the treatment units of the proposed action is displayed in the Invasive Plant section of the DEIS, figure 25, p 133.
One of the biggest problems with the FS's failure to deal forthrightly with the noxious weed problem on a forest wide basis is that the long-term costs are never adequately disclosed or analyzed. The public is expected to continuously foot the bill for noxious weed treatments—the need for which increases yearly as the BDNF continues the large-scale propagation of weeds, and fails to monitor the effectiveness of all its noxious weed treatment plans to date. There is no guarantee that the money needed for the present management direction will be supplied by Congress, no guarantee that this amount of money will effectively stem the growing tide of noxious weed invasions, no accurate analysis of the costs of the necessary post-treatment monitoring, and certainly no genuine analysis of the long-term costs beyond those incurred by site specific weed control actions.	1 and 12	The Beaverhead-Deerlodge National Forest takes the responsibility to prevent and eliminate invasive species very seriously. Crews have been very effective in reducing invasive species in the past (p. 130 of the DEIS). Although the Forest has no control over Congressional appropriations, the Beaverhead-Deerlodge National Forest will continue to have an aggressive invasive species control program commensurate with funding.
What minimum standards are in the BD National Forest Plan to address noxious weed infestations? The failure to include preventive standards violates NFMA because the Forest Service is not ensuring the protection of soils and native plant communities.	1 and 12	The Beaverhead-Deerlodge National Forest Land and Resource Management Plan contains a noxious weed objective that states: Prevent, reduce, or eliminate infestations of non-native or noxious weed species with emphasis on areas where

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		there is a high likelihood of establishment and spread. Manage noxious weeds through Integrated Pest Management as described in the most current Beaverhead-Deerlodge Noxious Weed Control Record of Decision. The proposed action contains weed prevention practices that target limiting the spread of invasive species, (DEIS, p. 136).
Please disclose how the productivity of the land been affected in the project area and forestwide due to noxious weed infestations, and how that situation is expected to change in the coming years and decades.	1 and 12	The forestwide invasive species situation was discussed in the Beaverhead-Deerlodge National Forest Noxious Weed Control FEIS (USDA Forest Service 2002). On page 3-42 of the FEIS, the existing condition of the effects of weeds on the soil resource is discussed. In short, soil quality indicators are "normal" in infestations that have been treated successfully. On weed-dominated sites that have not been treated or where treatment has not been very effective, "organic matter is lower and structure in the surface soil may have been altered. Erosion rates appear to have increased in some cases." The Pintler Ranger District has an aggressive and effective invasive species management program. Invasive species infested acres

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		have been reduced by 48% in the last 10 years within the project area (Invasive Plant section, existing condition, p. 130). There is a high likelihood that infested acres would continue to decline into the foreseeable future within the project area. The overall effect of weeds on soil productivity in the project area is discussed in the Soil section of the DEIS, p. 250. In summary, the effects of weeds on soil productivity is very minimal overall, due to limited presence along roadsides (not productive soils), and continuing weed treatments in accordance with the Beaverhead-Deerlodge National Forest Noxious Weed Control Record of Decision (USDA Forest Service 2002). While the potential for impacts to soil productivity exists as a result of noxious weed infestation, the actual impact to long term soil productivity is likely minimal, due to the following: The Invasive Plant resource report describes a low risk of noxious weeds becoming established and/or spreading in proposed treatment units within the analysis area. The mitigation measures listed in

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		the DEIS include monitoring for and treating noxious weeds within units and along roads. Treatment of noxious weeds with herbicides on the Beaverhead-Deerlodge NF has been effective (infested acres reduced by 49% over the last ten years on the Pintler Ranger District) (Rasor 2012). Land productivity forestwide requires higher-level analysis.
Native plants are the foundation upon which the ecosystems of the Forest are built, providing forage and shelter for all native wildlife, bird and insect species, supporting the natural processes of the landscape, and providing the context within which the public find recreational and spiritual opportunities. All these uses or values of land are hindered or lost by conversion of native vegetation to invasive and noxious plants. The ecological threats posed by noxious weed infestations are so great that a former chief of the Forest Service called the invasion of noxious weeds “devastating” and a “biological disaster.” Despite implementation of Forest Service “best management practices” (BMPs), noxious weed infestation on the Forest is getting worse and noxious weeds will likely overtake native plant populations if introduced into areas that are not yet infested. The Forest Service has recognized that the effects of noxious weed invasions may be irreversible. Even if weeds are eliminated with herbicide treatment, they may be replaced by other weeds, not by native plant species. Invasive plant species, also called noxious weeds, are one of the greatest modern threats to biodiversity on earth. Noxious weeds cause harm because they displace native plants, resulting in a loss of diversity and a change in the structure of a plant community. By removing native vegetative cover, invasive plants like knapweed may increase sediment yield and surface runoff in an ecosystem. As well knapweed may alter organic matter distribution and nutrient through a greater ability to uptake phosphorus over some native species in grasslands. Weed colonization can alter fire behavior by increasing flammability: for example, cheatgrass, a widespread noxious weed on the Forest, cures early and leads to more frequent burning. Weed colonization can also deplete soil nutrients and change the physical structure of soils. The Forest Service’s own management activities are largely responsible for noxious weed infestations; in particular, logging, prescribed burns, and road construction and use create a risk of weed infestations. The introduction of logging equipment into the Forest creates and exacerbates noxious weed infestations. The removal of trees through logging can also facilitate the establishment of noxious weed infestations because of soil disturbance and the reduction of canopy closure In general, noxious weeds occur in old clearcuts and forest	1 and 12	Thank you for your comment. The Beaverhead-Deerlodge National Forest agrees with your statements. This is why we have developed strict design features and mitigation measures and have an aggressive integrated approach to reducing invasive species on the Forest.

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openings, but are rare in mature and old growth forests. Roads are often the first place new invader weeds are introduced. Vehicle traffic and soil disturbances from road construction and maintenance create ideal establishment conditions for weeds. Roads also provide obvious dispersal corridors. Roadsides throughout the project area are infested with noxious weeds. Once established along roadsides, invasive plants will likely spread into adjacent grasslands and forest openings.		
Prescribed burning activities within the analysis area would likely cumulatively contribute to increases to noxious weed distribution and populations. As a disturbance process, fire has the potential to greatly exacerbate infestations of certain noxious weed species, depending on burn severity and habitat type (Fire Effects Information System 2004). Soil disturbance, such as that resulting from low and moderate burn severities from prescribed fire and fire suppression related disturbances (dozer lines, drop spots, etc.), provide optimum conditions for noxious weed invasion. Dry site vegetation types and road corridors are extremely vulnerable, especially where recent ground disturbance (timber management, road construction) has occurred. Units proposed for burning within project area may have closed forest service access roads (jammers) located within units. These units have the highest potential for noxious weed infestation and exacerbation through fire activities.	1 and 12	The Invasive Plant section of the DEIS, p. 137, addresses the direct, indirect and cumulative effects associated with invasive species and prescribed burning.
Please define what the current status of noxious weeds is on the BDNF, as per trends of weed infestations, and define how the current project will affect this trend.	3	The analysis for this project focused on NFS land within the project area. The general trend within the BDNF is a decline in the total number of acres infested by invasive species. The project is discussed beginning on p.137 of the Invasive Species section.

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Please define the expected increase in noxious weed infestations after this project is completed	3	Please see the Summary of Effects sections under alternative 2 in the Invasive Plant section of the DEIS, p.140.
What is the expected control of noxious weed infestations that will be generated from this project?	3	The Pintler Ranger District has an aggressive and effective invasive species management program. Invasive species infested acres have been reduced by 48% in the last 10 years with the project area DEIS, p.132, There is a high likelihood that infested acres would continue to decline into the foreseeable future within the project area.
Will the monies and manpower be available to even control new populations of noxious weeds generated by this project, let alone to eliminate them?	3	The Beaverhead-Deerlodge National Forest takes its responsibility to prevent and eliminate invasive species very serious. Crews have been very effective in reducing invasive species in the past, Invasive Plant section, DEIS, p. 132). Although the Forest has no control over Congressional appropriations, the Beaverhead-Deerlodge National Forest will continue to have an aggressive invasive species control program commensurate with its funding.
Please provide a summary of the existing weed infestations, and what the trend in these infestations has been. If weeds are never eliminated in harvest units and along roads, please define the proposal as an irretrievable impact on the environment.	13	Please see the Invasive Plant section of the DEIS, figure 25 in the existing condition, for a summary of existing invasive species infestations.
Herbicide Use		

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Herbicides should be applied at the lowest rate effective in meeting weed control objectives and according to guidelines for protecting public health and the environment. The Montana Water Quality Standards include a general narrative standard requiring surface waters to be free from substances that create concentrations which are toxic or harmful to aquatic life.	11	Herbicides are applied to the Forest in accordance with the Beaverhead-Deerlodge National Forest Noxious Weed Control Final Environmental Impact Statement and Record of Decision 2002 as well as the specific herbicide label specifications.
Vegetation – Native, TES and Rare Plants/Whitebark Pine/Old Growth		
Native, TES and Rare Plants		
When areas treated with herbicides are reseeded on national forest land, they are usually reseeded with exotic grasses, not native plant species. What native plant restoration activities will be implemented in areas disturbed by the actions proposed in this project? Will disturbed areas including road corridors, skid trails, and burn units be planted or reseeded with native plant species?	1 and 12	Use of native seed mix is identified in project design features and mitigation measures, (DEIS p.43) as follows: Constructed skid trails, landings, and temporary roads would be obliterated and revegetated with native seed mix approved by the Forest Service (SWCP 15.25). Landings would be revegetated with native seed and areas of compacted soil would be scarified prior to seeding (SWCP 14.11). Following burning, landings would be reseeded within one year using native seed mix approved by the Forest Service.
The ESA requires that the Forest Service conserve endangered and threatened species of plants as well as animals. In addition to plants protected under the ESA, the Forest Service identifies species for which population viability is a concern as “sensitive species” designated by the Regional Forester (FSM 2670.44). The response of each of the sensitive plant species to management activity varies by species, and in some cases, is not fully known. Local native vegetation has evolved with and is adapted to the climate, soils, and natural processes such as fire, insect and disease infestations, and windthrow. Any management or lack of management that causes these natural processes to be altered may have impacts on native vegetation, including threatened and sensitive plants. Herbicide application – intended to eradicate invasive plants – also	1 and 12	Refer to the Sensitive Plant section of the DEIS, pp. 113 There are no known federally listed threatened or endangered plants on the Beaverhead-Deerlodge National Forest. Surveys were conducted within the project area, targeting

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results in a loss of native plant diversity because herbicides kill native plants as well as invasive plants. Although native species have evolved and adapted to natural disturbance such as fire on the landscape, fires primarily occur in mid to late summer season, when annual plants have flowered and set seed. Following fall fires, perennial root-stocks remain underground and plants emerge in the spring. Spring and early summer burns could negatively impact emerging vegetation and destroy annual plant seed.		potential habitats for both listed and sensitive plants and no federally listed threatened or endangered plant species were found. Concerted effort was made to conduct surveys during the flowering windows when the likelihood of detection is highest. The impacts/response of sensitive plants to management activities have been discussed in detail in the sensitive plants section of this document. Some sensitive species analyzed could have some long-term benefits from management activities by removing competing overstory cover, and creating potentially suitable disturbance habitats as discussed in further detail in the sensitive plants effects analysis, DEIS p. 125. As discussed in the sensitive plants report and incorporated into the EIS, invasion of exotic species can have long term impacts on sensitive plant species. Invasive exotic plants can make occupied and potential habitats unsuitable for sensitive plant species. The control of weeds through various means can benefit sensitive plants by reducing invasive species from their habitats. However control methods, such as broadcast

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		spraying, can cause short-term harm to sensitive plants if they come into contact with the chemical (USDA Forest Service 2000-Ode). The Beaverhead-Deerlodge Weed Management Plan (2002) protects sensitive plants by employing the following mitigation measure: No herbicide will be applied directly on sensitive plants during spot applications and a 100’ buffer will be employed around known populations of sensitive plants during broadcast applications (including aerial). All aerial treatment areas will be surveyed for sensitive plants prior to initial spraying. Weed control activities do occur within the project area, but not within the immediate vicinity of the known sensitive plant populations, as no noxious weeds were currently present. Weed control activities are not known to be posing any impacts to sensitive plants within the project area at this time. Spring burning would occur when soil moisture is high, resulting in little impact if any to the duff layer, let alone the subterranean root structures of potential sensitive

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		plants. As noted in the comment, these plants evolved with fire. Although natural fire may have been more likely to occur during late summer or fall months in the past, spring burning poses even less likely to affect the potential sensitive plant populations and habitat because of the low severity nature of these burn. The impact to annual plant seed is mentioned; however only one sensitive plant analyzed in the Flint Foothills EIS is an annual, Austin's knotweed. Austin's knotweed occurs in sparsely vegetated locations that would not likely carry fire.
What threatened, endangered, rare and sensitive plant species and habitat are located within the proposed project area? What standards will be used to protect threatened, rare, sensitive and culturally important plant species and their habitats from the management actions proposed in this project? Describe the potential direct and indirect effect of the proposed management actions on rare plants and their habitat. Will prescribed burning occur in the spring and early summer; please give justifications for this decision using current scientific studies as reference.	1 and 12	It is Forest Service policy to protect the habitat of federally listed threatened and endangered species (FSM 2670.31), and to avoid or minimize adverse impacts to species designated by the Forest Service as sensitive (FSM 2670.32). The Beaverhead-Deerlodge National Forest is directed by the Forest Plan to maintain and restore sensitive plant populations and their habitat. No federally threatened or endangered plants are known to occur on the Beaverhead-Deerlodge National Forest, nor

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		were found during project surveys. Direct and indirect effects to sensitive plants and their habitat found in the project area are presented in the DEIS, p. 123 Burning would occur when weather and ground conditions are suitable to maintain air quality and burning can be controlled. Ignitions may occur over multiple years. A spring burn period would be preferred to minimize the spread of fire over the ground vegetation, but either a spring or fall burn would be acceptable.
Whitebark Pine		
Not all ecosystems or all Rocky Mountain landscapes have experienced the impacts of fire exclusion. In some wilderness areas, where in recent decades natural fires have been allowed to burn, there have not been major shifts in vegetation composition and structure (Keane et al. 2002). In some alpine ecosystems, fire was never an important ecological factor. In some upper subalpine ecosystems, fires were important, but their rate of occurrence was too low to have been significantly altered by the relatively short period of fire suppression (Keane et al. 2002). For example, the last 70 to 80 years of fire suppression have not had much influence on subalpine landscapes with fire intervals of 200 to several hundred years (Romme and Despain). Consequently, it is unlikely that fire exclusion has yet to significantly alter stand conditions or forest health within Rocky Mountain subalpine ecosystems. Whitebark pine seedlings, saplings and mature trees, present in subalpine forests proposed for burning, would experience mortality from project activity. Whitebark pine is fire intolerant (thin bark). Fire favors whitebark pine regeneration (through canopy opening and reducing competing vegetation) only in the presence of adequate seed source and dispersal mechanisms (Clarks Nutcracker or humans planting whitebark pine seedlings). White pine blister rust, an introduced disease, has caused rapid mortality of whitebark pine over the last 30 to 60 years. Keane and Arno (1993) reported that 42 percent of whitebark pine in western Montana had died in the previous 20 years with 89 percent of remaining trees being infected with blister rust. The ability of whitebark pine to reproduce naturally is strongly affected by blister rust infection; the rust kills branches in the upper cone bearing crown, effectively ending seed production.	1 and 12	"Not all ecosystems or all Rocky Mountain landscapes have experienced the impacts of fire exclusion *as yet*" (emphasis added; Keane et al. 2002). The natural processes of vegetation succession are reflective of the natural disturbance regime (or fire regime); there are effects to succession as fire suppression has occurred in the past 100 years, however this may not be reflected in an individual stand. Long-term fire intervals in lodgepole pine and spruce-fir subalpine types may not yet be manifested at the stand level, but are detectable at the landscape

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Montana is currently experiencing a mountain pine beetle epidemic. Mountain pine beetle prefer large, older whitebark pine, which are the major cone producers. In some areas the few remaining whitebark that show the potential for blister rust resistance are being attacked and killed by mountain pine beetles, thus accelerating the loss of key mature cone-bearing trees. In the absence of fire, this naturally occurring whitebark pine regeneration would continue to function as an important part of the subalpine ecosystem. Since 2005, rust resistant seed sources have been identified in the Northern Rockies (Mahalovich et al 2006). Due to the severity of blister rust infection within the region, natural whitebark pine regeneration in the project area is prospective rust resistant stock. Although prescribed burning can be useful to reduce areas of high-density subalpine fir and spruce and can create favorable ecological conditions for whitebark pine regeneration and growth, in the absence of sufficient seed source for natural regeneration maintaining the viability and function of whitebark pine would not be achieved through burning. Planting of rust-resistant seedlings would likely not be sufficient to replace whitebark pine lost to fire activities.		level (Keane et al. 2002). Even though late-seral species may differ across a landscape depending on site, the multilayer structures of these late-seral stands are nearly identical across most biophysical settings (Keane et al. 2002). There are measured declines of whitebark pine and young lodgepole pine stands and increases in subalpine fir after 91 years on a fire-excluded Northern Rocky Mountain subalpine landscape (Keane et al. 2002). Blister rust and MPB have accelerated succession to subalpine fir by killing mature whitebark pine, and MPB has killed the majority of lodge pole pine in the project area; this coupled with the lack of fire as a recycling agent has caused a major shift in landscape composition and structure from one of pine to fir and spruce (Keane 2000). Therefore, fire exclusion may not have impacted every single stand within the subalpine forest of mid- to high elevations within the project area, but from a project-wide or landscape perspective, there are changes to the forest that are detrimental to early seral forest species such as whitebark pine. The reference to alpine ecosystems (Keane et al. 2002)

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		refers to above tree-line habitats, which this proposal does not include in treatment alternatives. If fire were to be ignited in whitebark pine stands, whitebark pine trees would experience mortality. This proposal does not include burning in whitebark pine stands, rather focuses on lodgepole dominated forests. However, one unit is known to have whitebark pine; fire ignitions would avoid where whitebark pine occurs in groups or clumps. This would not only provide a means of protection for live mature trees, but established whitebark pine regeneration. There is potential for individual whitebark pine trees to be killed with prescribed burning treatments; however, the resulting canopy openings would be conducive for seeding by Clarks nutcrackers birds. Decline of whitebark pine both regionally and in the project area is occurring. Monitoring conducted for whitebark pine has shown successful natural regeneration of whitebark pine in stands of more pure whitebark pine; where over 200 seedlings per acre were counted (BDNF 2010). In mixed

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		conifer stands, this number dropped to 30 seedlings per acre when the whitebark pine occupies about 1/3 of the trees per acre (BDNF 2010). The prescribed burn design criteria with this proposal would avoid whitebark pine where it occurs in groups, or is more than 20% of the basal area within the stand. Therefore, the created 'favorable ecological conditions for whitebark pine regeneration and growth' would be provided without the fire effects on extensive areas of existing whitebark pine. This action is preferable, regardless of the amount of actual whitebark pine regeneration that is derived over time from the proposed prescribed burning, just to allow the opportunity for a small increase in whitebark presence in the project area.
Are whitebark pine seedlings and saplings present in the subalpine forests proposed for logging?	1 and 12	No whitebark pine has been found through field surveys in any of the proposed harvest (logging) units. Formal surveys will be conducted prior to project implementation.
What surveys have been conducted to determine presence and abundance of whitebark pine regeneration? If whitebark pine seedlings and saplings are present, what measures will be taken to protect them? Will restoration efforts include planting whitebark pine? Will planted seedling be of rust-resistant stock? Is rust resistant stock available? Would enough seedlings be planted to replace whitebark pine lost to fire activities? Have white pine blister rust surveys been accomplished? What is the severity of white pine blister rust in proposed action areas?	1 and 12	Walk-through informal surveys have been conducted in the proposed prescribed burn units, and a mix of walk-through and formal stand exams have been conducted in the proposed harvest units. No whitebark pine has been found in the proposed harvest units. There has been

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		scattered whitebark pine found in the upper elevation (above 7,000 feet elevation) of Unit 5B, a proposed prescribed burn unit, and may occur in other burn units. The proposed implementation criteria are designed to avoid burning activities (including accounting for potential spread) where concentrations of whitebark pine occur. The concentrations of whitebark pine are where stand-scale gap dynamics with mortality of pine trees in clumps have created opportunities for whitebark pine natural regeneration; hence, these are the locations where seedlings and saplings occur. These areas would be avoided with the prescribed burn. However, individual whitebark pine may be affected by prescribed burn activities. No other restoration efforts, including planting of whitebark pine, would occur. No white pine blister rust surveys have been accomplished. White pine blister rust has been observed with walk-through surveys, and is affecting whitebark pine trees in the project area.
It is not clear why the proposed treatments will enhance and protect whitebark pine. Please provide the monitoring and published science that ensures that the proposed treatments will actually promote viability of this species.	3	Neither the purpose and need for the proposed project, DEIS p. 4, nor the design of the proposed treatments Chapter 2 beginning on p. 13, include objectives to

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		enhance or protect whitebark pine. The proposed prescribed fire treatments of mixed conifer stands are the highest priority (GYCC 2011) where a return mixed severity burns of differing intensities create complex patters of tree mortality, providing opportunities for seed caching sites (Keane and Arno 2001). No monitoring of these types of treatments has occurred on the Forest as these treatments have not been conducted. Long-term monitoring plots of whitebark pine have been installed on the Forest, and include an old wildfire area, where in the opening created by fire there is an excess of 400 whitebark pine seedlings per acre (BDNF 2010). Treatment design includes avoiding groups of whitebark pine and target mixed conifer areas to retain whitebark pine.
Old Growth		
Unfortunately, region-wide the FS has failed to meet Forest Plan old-growth standards, does not keep accurate old-growth inventories, and has not monitored population trends in response to management activities as required by Forest Plans and NFMA (Juel, 2003).	1 and 12	The Vegetation section of the DEIS, starting on page 74, provides a summary of old growth estimates in the analysis area. The Clark Fork – Flints Landscape has an estimated 20.9% of the Landscape in an old growth condition, indicating that old growth in the Landscape is not deficient at the regional scale (Bush et al 2006). Additionally, project-specific stand exams were

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		conducted in all of the Douglas-fir – ponderosa pine proposed units, and the amount of old growth discovered is displayed in the Vegetation analysis.
Please disclose how stands to be treated compare to Forest Plan or Regional old-growth criteria. In order to disclose such information, please provide all the details, in plain language, of these areas' forest characteristics (the various tree components' species, age and diameter of the various tree components, canopy closure, snag density by size class, amounts of down logs, understory composition, etc.).	1 and 12	Table 32, p. 90 in volume 1 DEIS in the Vegetation section displays the minimum criteria of each stand within each proposed harvest unit that currently has old growth. The minimum criteria to meet old growth are minimum age of the large trees, minimum number of trees that meet the minimum diameter-at-breast-height (DBH), and the minimum basal area of the stand as a whole (Green et al 2007). There are no minimum criteria for the associated characteristics of DBH variation, percent dead/broken top, probability of downed woody, percent of decay, number of canopy layers and snags (Green et al 2007).
Please define and map all the old growth in the project by each old growth type as per Green et al. 1992*[see literature review].* We would like to know how much old growth and its location is for Douglas-fir old growth. We would like to know where lodgepole pine old growth occurs and its acreage. And we would like to know where spruce old growth currently exists. We would also like to know how much of each of these old growth types are planned for logging in this project.	3	The Forest Plan does not require mapping of all old growth in the project area. The definitions for old growth are from Green et al 2007 errata corrected. Old growth inventories were done through the stand exams conducted for each of the proposed harvest units in the Douglas-fir – ponderosa pine vegetation type. The amount and location of old growth associated with these inventories is displayed in the Vegetation section, table 32

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		p. 90. None of the lodgepole pine proposed salvage units contain old growth, as they all are in a dead and dying status due to MPB. Inventories outside of the proposed harvest or prescribed burn units did not occur, so it is unknown how much lodgepole pine and or spruce old growth occurs in the project area. The project design meets the Forest Plan standard to retain all old growth with all of the proposed treatment activities.
It is important to prevent continued loss of this habitat and promote long-term sustainability of old growth stands, and restore where possible the geographic extent and connectivity of old growth (e.g., using passive and active management-such as avoiding harvest of old growth trees, leaving healthy larger and older seral species trees, thinning and underburning to reduce fuel loads and ladder fuels in old growth while enhancing old growth characteristics).	11	All old growth would be retained with the proposed project, which meets the Forest Plan standard for old growth. Where proposals to treat in old growth (a total of 121 acres in alternative 2), the old growth minimum criteria of old age, number of large trees per acre, and basal area would be retained. The old growth type of late seral, multi-storied stands would be shifted to the old growth type of late seral, single storied stands. Additionally, the proposed treatments extend beyond the old growth stands into adjacent Douglas-fir – ponderosa pine mature stands; these treatments would accelerate the time the mature stands become old growth, which would extend the geographic extent and improve connectivity of old growth.

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It would be helpful to define old growth for the project area (e.g., specify large tree age, trees/acres greater than certain DBH, etc).	11	Old growth is defined by Green et al 2007, and is displayed by stand in the Vegetation section of the DEIS p. 90, Table 32.
We note that lands outside the forest boundary have often not been managed for the late-seral or old growth component, so National Forest lands may need to contribute more to the late-seral component to compensate for the loss of this component on other land ownerships within an ecoregion.	11	Land management strategies outside of the project area boundary are outside the scope of this project. However, the project area is dominated by mature and old stands (23,410 acres of mid to late seral out of 44,522 acres total project area; see Vegetation analysis). Mountain pine beetle has affected the 8,556 acres of mid to late seral pine stands, and this proposal would thin additional Douglas-fir – ponderosa pine stands, but with retention of the largest and oldest trees.
We would like to address one of the preliminary issues/concerns identified in the document. That is the maintenance of old growth stand characteristics where encountered. Both Mountain pine beetle and Douglas Fir bark beetle predominantly target mature trees. In other words, old growth. Continued overstocking of forest resources only adds to moisture stress experienced by mature trees. The proposed action will do exactly the opposite of threatening old growth. Continued overstocking and failure to actively manage forest resources provides a greater threat to old growth than responsible removal of dead and dying trees.	5	Thank you for your comment. The purpose of the proposed commercial thinning of Douglas-fir – ponderosa pine stands is to reduce stand densities for the growth and yield of sawtimber, crop trees, pulpwood, and other forest products, and use forest products to provide economic benefits where project objectives, forest plan objectives, and forest plan standards can be met.
Please provide a thorough inventory of old growth as per Region I criteria in Green et al. 1992. We would like to see a breakdown of each old growth type, and how many of these stands were field verified. We don't consider using a stand exam or satellite mapping as" verified." In either case, please demonstrate the reliability of the old growth analysis.	13	A thorough inventory of old growth was completed of each proposed treatment unit, and is displayed in the Vegetation section of the DEIS pp. X. This includes a breakdown of each old

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		growth type found, and in which unit old growth occurs. Satellite imagery was not used to determine or 'verify' old growth. However, stand exams were used, and are the highest standard with which to determine old growth; stand exams are an unbiased, systematic, on-the-ground evaluation of a stand, and are conducted to Regional statistical standards. These exams were conducted where old growth was likely to occur. The remaining units were field reviewed by a certified silviculturist. Both the results of the stand exams and the compilation of field notes are a part of appendix E of the DEIS.
There is currently no old growth management strategy for the Forest. Until this Forest Plan flaw is corrected, there should be no logging on the Forest.	13	The Forest Plan has old growth goals, objectives and standards in the Vegetation section provide the management strategy for the BDNF (see Forest Plan pages 43-44).
Vegetation – Ecosystems/Habitats/Fire Cycles		
Ecosystems		
Proposed activities could artificialize the forest ecosystem. Lodgepole pine is particularly subject to blowdown, once thinned. And any forest condition that is maintained through mechanical manipulation is not maintaining ecosystem function The proposed management activities would not be integrated well with the processes that naturally shaped the ecosystem and resulted in a range of natural structural conditions. Thus, [there is a] need for standards guiding both the delineation of zones where artificializing fuel reduction actions may take place, and that also set snag and down woody debris retention amounts.	1 and 12	Lodgepole pine has 70% mortality and is mostly dead in units. We are targeting commercial thin treatments to Douglas-fir and some blowdown may occur in lodgepole pine We are leaving snags in clusters to create more stabilization to

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		keep more snags standing. The project will follow all standards in the Forest Plan
Veblen (2003) questions the premises the FS often puts forth to justify "uncharacteristic vegetation patterns" discussions, that being to take management activities to alter vegetation patterns in response to fire suppression: The premise behind many projects aimed at wildfire hazard reduction and ecological restoration in forests of the western United States is the idea that unnatural fuel buildup has resulted from suppression of formerly frequent fires. This premise and its implications need to be critically evaluated by conducting area-specific research in the forest ecosystems targeted for fuels or ecological restoration projects. Fire regime researchers need to acknowledge the limitations of fire history methodology and avoid over-reliance on summary fire statistics such as mean fire interval and rotation period. While fire regime research is vitally important for informing decisions in the areas of wildfire hazard mitigation and ecological restoration, there is much need for improving the way researchers communicate their results to managers and the way managers use this information.	1 and 12	The purpose and need for this project does not include wildfire hazard reduction or ecological restoration, DEIS p.4. Additionally, there is not a proposal to reduce an unnatural fuel buildup resulting from suppression, nor is there a statement in the analysis that says there is an unnatural fuel buildup resulting from suppression.
The FS has acknowledged that viability is not merely a project area consideration, that the scale of analysis must be broader: Population viability analysis is not plausible or logical at the project level such as the scale of the Dry Fork Vegetation and Recreation Restoration EA. Distributions of common wildlife species as well as species at risk encompass much larger areas than typical project areas and in most cases larger than National Forest boundaries. No wildlife species that presently occupy the project area are at such low numbers that potential effects to individuals would jeopardize species viability. No actions proposed under the preferred alternative would conceivably lead to loss of population viability. (Lewis and Clark NF, Dry Fork EA Appendix D at p. 9.)	1 and 12	The commenter is referring to a separate project on a different National Forest. For the BDNF, species viability was analyzed at the Forest-scale for the Forest Plan (Forest Plan FEIS, Revised Appendix B). Viability for species requiring a larger analysis area (e.g. black-backed woodpecker and flammulated owl) was analyzed at the regional level by Samson (2006) and tiered to in the Forest Plan FEIS.
The FS should firmly establish that the species that exist, or historically are believed to have been present in the analysis area are still part of viable populations. Since Forest Plan monitoring efforts have failed in this regard, it must be a priority for project analyses. Identification of viable populations is something that must be done at a specific geographic scale. The analysis must cover a large enough area to include a cumulative effects analysis area that would include truly viable populations. Analysis must identify viable populations of MIS, TES, at-risk, focal, and demand species of which the individuals in the analysis area are members in	1 and 12	It is too early to speculate that Forest Plan monitoring has failed, since the Forest Plan has only been in place since 2009. See previous response regarding viability analysis.

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order to sustain viable populations		The Sensitive Plant, Wildlife and Aquatics sections of the DEIS, pp. 113, 143 and 297, identify and disclose effects to TES in the project area. The Wildlife and Aquatic sections address MIS.
Habitats		
Since the Beaverhead-Deerlodge National Forest (BDNF) does not have a management indicator species (MIS) for **forest interior habitat**, it is not clear how viability of this suite of species will be provided for in the project area. There are currently no management standards in the Forest Plan for these many species. This project cannot meet the requirements of either the NEPA or the National Forest Management Act (NFMA) without conservation strategies for these species when their habitat will be degraded/removed with logging.	3	Specific species were not identified as associated with forest interior habitat. The Forest Plan assumes that maintaining historic patterns and size class structure will maintain habitats for species that evolved and are adapted to these local habitat conditions.
We are concerned about the lack of an MIS for old growth habitat. How can the agency ensure the viability of this suite of species, or those many species benefited by old growth, without an MIS? How can the agency measure management impacts on old growth habitat condition and recruitment without monitoring an MIS?	3	MIS are selected at the Planning Area scale. The Forest Planning record includes documentation of the rationale for selection of MIS. The Forest Plan FEIS (pg. 689) states that the plan has not identified a wildlife old growth MIS in preference to monitoring old growth using Forest Inventory and Analysis (FIA).
Fire Cycles		
Since disruption of fire cycles is identified, the BDNF needs to take a hard look at its fire policies. The development of approved fire management plans in compliance with the Federal Wildland Fire Policy was the number one policy objective intended for immediate implementation in the Implementation Action Plan Report for the Federal Wildland Fire Management Policy and Program Review. In general,the FS lags far behind other federal land management agencies that have already invested considerable amounts of time, money, and resources to implement the Fire Policy. Continued mismanagement of national forest lands and FS refusal to fully implement the Fire Policy puts wildland firefighters at risk if and when they are dispatched to wildfires. This is a programmatic issue, one	1 and 12	The purpose and need for the Flint Foothills project, DEIS p.4, does not include addressing BDNF fire policies. Fire management is addressed on p. 22 of the Forest Plan.

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that the current Forest Plan does not adequately consider. Please see Ament (1997) as comments on this proposal, in terms of fire policy and Forest Planning.		
Fire/Fuels/Air Quality		
Fire and Fuels		
WUI that's relevant to this area must be displayed on a map. More importantly, the fuel/fire hazard situation post-project on land of all ownerships within the WUI must also be displayed on a map. Based on this mapping of current and projected conditions, please accurately disclose the threats to private structures and people under those scenarios, for all alternatives. It must be discernable why some areas are included for treatment and others are not. The FS must have a detailed long-term program for maintaining the allegedly safer conditions, including how areas will be treated in the future following proposed treatments, or how areas not needing treatment now will be treated as the need arises. The public at large and private landowners must know what the scale of the long-term efforts must be, including the amount of funding necessary, and the likelihood based on realistic funding scenarios for such a program to be adequately and timely funded. The FS must assess the fuel and fire risk situation across land ownership boundaries to understand, and disclose to the public, the likely fire scenarios across the area's landscape. Only then can the context of your proposal be adequately weighed on its merits and evaluated on its merits.	1 and 12	There is no identified WUI from the County Wildfire Protection Plan within the project area. The purpose and need for the project, DEIS p.4, does not include addressing fuel and fire risk.
The FS (Cohen, 1999) reviewed current scientific evidence and policy directives on the issue of fire in the wildland/urban interface and recommended an alternative focus on structure ignitability rather than extensive wildland fuel management: The congruence of research findings from different analytical methods suggests that home ignitability is the principal cause of home losses during wildland fires… Home ignitability also dictates that effective mitigating actions focus on the home and its immediate surroundings rather than on extensive wildland fuel management. [Research shows] that effective fuel modification for reducing potential WUI fire losses need only occur within a few tens of meters from a home, not hundreds of meters or more from a home. This research indicates that home losses can be effectively reduced by focusing mitigation efforts on the structure and its immediate surroundings. Those characteristics of a structure's materials and design and the surrounding flammables that determine the potential for a home to ignite during wildland fires (or any fires outside the home) will, hereafter, be referred to as home ignitability. The evidence suggests that wildland fuel reduction for reducing home losses may be inefficient and ineffective. Inefficient because wildland fuel reduction for several hundred meters or more around homes is greater than necessary for reducing ignitions from flames. Ineffective because it does not sufficiently reduce firebrand ignitions (Cohen, 1999) That research also recognizes "the imperative to separate the problem of the wildland fire threat to homes from the problem of ecosystem sustainability due to changes in wildland fuels" (Ibid).	1 and 12	The purpose and need for the Flint Foothills project, DEIS p.4, does not include a reduction in the risk of wildfire to reduce the treat to homes, or relate ignition probability of structures within a defined wildland-urban interface (WUI). The project area is not within a WUI. The Cohen, 1999 citation references the flammability of structures within a defined urban interface, and defines who should be responsible for fuels treatment within WUI and the effectiveness of said treatments in reducing wildfire risk and spread. This paper discusses how wildland

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		vegetation management could not necessarily protect a home from fire, and homeowners are ultimately responsible for protecting their homes from fire. Cohen states, “home ignitability, i.e., the potential for a home fire loss, is the homeowner‘s choice and responsibility.” This paper does not state that vegetation management is not needed; in fact it discusses the need for management to enhance the ability to control fires in WUIs. This quotation has been taken out of context.
Please consider that thinning can result in faster fire spread than in the unthinned stand. Graham, et al.1999a. Graham, etal., 1999a point out that fire modeling indicates: For example, the 20-foot wind speed1 must exceed 50 miles per hour for midflame wind speeds to reach 5 miles per hour within a dense Stand (0.1 adjustment factor). In contrast, in an open stand (0.3 adjustment factor), the same midflame wind speeds would occur at only a 16-mile-per-hour wind at 20 feet. Graham, et al., 1999a also state: Depending on the type, intensity, and extent of thinning, or other treatment applied, fire behavior can be improved (less severe and intense) or exacerbated.” … Fire intensity in thinned stands is greatly reduced if thinning is accompanied by reducing the surface fuels created by the cuttings. Fire has been successfully used to treat fuels and decrease the effects of wildfires especially in climax ponderosa pine forests (Deeming 1990; Wagel and Eakle 1979; Weaver 1955, 1957). In contrast, extensive amounts of untreated logging slash contributed to the devastating fires during the late 1800s and early 1900s in the inland and Pacific Northwest forests. In their conclusion, Graham, et al., 1999a state: Depending on intensity, thinning from below and possibly free thinning can most effectively alter fire behavior by reducing crown bulk density, increasing crown base height, and changing species composition to lighter crowned and fire-adapted species. Such intermediate treatments can reduce the severity and intensity of wildfires for a given set of physical and weather variables. But crown and selection thinnings would not reduce crown fire potential. Also, Hessburg and Lemkuhl (1999) suggest that prescribed burning alone can be utilized in many cases—possibly here—where managers typically assume mechanical fuel reductions must be used. Since the scientific literature suggests that thinning activities will actually increase the rate of fire spread, you need to	1 and 12	While the purpose and need for the Flint Foothills project, DEIS, p.4, does not include fuel or fire risk reduction, and neither scoping letter addressed rate of spread, Graham et. al. is addressed with respect to rate of spread: The type of thinning done does make a difference (can influence) to fire behavior. Depending on intensity, thinning from below and possibly free thinning can most effectively alter fire behavior by reducing crown bulk density, increasing crown base height, and changing species composition to lighter crowned and fire-adapted species (Graham et al. 1999). The type of thinning prescribed with the project is thinning from below and free thinning. The paper goes

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reconcile such findings with the contradictory assumptions expressed in your scoping letter.		on to say that 'crown and selection thinning' would not reduce crown fire potential (Graham et al 1999); the proposal does not prescribe crown and selection thinning. Additionally, surface fuels created by treatments can increase intensity of surface wildfires (Graham et al. 1999); post-harvest prescribed burning is planned in the proposed units in addition to whole tree yarding of the non-merchantable material. Neither of the Flint Foothills scoping letters addressed rate of spread.
Any desire to keep a road in the project area WUI must be in harmony with the alleged priority goals (again, to reduce the chances that fire will destroy private structures and harm people), not driven by timber production goals. The analysis must show how all roads will in fact be in harmony with the priority goals.	1 and 12	The Flint Foothills project area is not in an identified wildland urban interface (WUI) area and has no priority goals to reduce the chances that fire will destroy private homes and harm people. The purpose and need for the Flint Foothills project, DEIS p.4, does not include fuel or fire risk reduction. Any road-related decisions are based on resource conditions.
I am concerned about the large amount of acreage that is being proposed to bum in this proposal. Many of the acres appear to be in heavily timbered areas and I question the ability to control fire in these areas. At the very least I would like to request that the salvage harvest and commercial thinning treatments be completed before you set fire to the countryside.	2	Ignition of the proposed prescribed burn units would be done when these treatments can be controlled, and would occur after the commercial harvest activities are completed.
Forest Service Responsible Officials Must Never take Action to Modify or Reduce Fire Severity because the	4	Thank you for your comment. The

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Natural Resources in the Forest Benefit from Fire.		purpose and need for the Flint Foothills project, DEIS, p.4, does not include the need to modify or reduce fire severity. Fire is being used as a tool to meet objectives for natural resources that benefit from fire. There are many situations, however, where the Forest Service might want to take action to modify or reduce fire severity and behavior where there is an identified value at risk to be protected.
Commercial timber sales intended to remove fuels (in order to slow the rate of fire spread and fire intensity) should not be prepared and implemented *(see Opposing Science Attachment #1 in literature review).*	4	The purpose and need for the Flint Foothills project DEIS, p.x does not include fuel reduction to slow the rate of fire spread and fire intensity. References included in the Opposing Science Attachment are addressed in the Literature Review section, table B-3 in this section.
Another issue we would like to address is the increased safety to Granite County citizens provided by the proposed action. Catastrophic wildfire is great concern for many in Granite County, and particularly for those living in rural portions of the County. We cannot stress enough our support for responsible removal of potential fuel for catastrophic fire concerns. We understand the argument that initially fire danger is high while the trees are "red" and is reduced until the trees fall to the forest floor when it raises again…	5	We appreciate the commenters concern for the safety of Granite County citizens related to catastrophic fire. The purpose and need for the Flint Foothills project, DEIS p. 4, does not include removal of fuels to mitigate catastrophic fire. In the future, if the Forest Service proposed removing fuels for the mitigation of catastrophic fire, those effects would be analyzed. No such proposals have been identified.
Ban fire. As for setting fires, burning vegetation releases mercury into the air. it also releases fine particulate matter which is microscopic and is not smoke. such fine particualte matter enters the human body and	8	Thank you for your comment.

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causes lung cancer, heart attacks, strokes,. pneumonia, allergies and asthma. nobody needs that.		
We are supportive of efforts to reduce hazardous fuels and fire risks and reduce wildfire intensity in Wildland Urban Interface (WUI) areas near homes and structures where there is high fire risk. The risks of uncharacteristic disturbances such as catastrophic wildfire should be evaluated versus the effects of active restoration designed to reduce those risks (i.e., water quality, fisheries and wildlife effects).	11 11	Thank you for your comment. The purpose and need for the Flint Foothills project DEIS, p. x does not include fuel or catastrophic fire risk reduction. Hence, the risk of uncharacteristic disturbances such as a wildfire is not evaluated.
Fire management does not require logging of entire landscapes to protect the public from fire. Fire buffers are sufficient.	13	Thank you for your comment**.**
Air Quality		
We recommend that the EIS discuss the *Interim Air Quality Policy on Wildland and Prescribed Fires,* and disclose how the Federal Land Manager is participating in a certified Smoke Management Program (e.g., Montana/Idaho State Airshed Group), and describe how prescribed burns will be in line with the State certified Smoke Management Program.	11	The Air Quality section of the DEIS, p. 104 addresses the *Interim Air Quality Policy on Wildland and Prescribed Fires.* The EPA (1998) issued this policy to balance the use of managed wildland fires and prescribed fires with protection of public health and welfare. It has two public policy goals: (1) to allow fire to function in its natural role in maintaining healthy wildland ecosystems, and (2) to protect public health and welfare by mitigating the impacts of air pollutant emissions on air quality and visibility. It identifies responsibilities of wildland owners/managers and state/tribal air quality managers to coordinate fire activities, minimize air pollutant emissions, manage

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		smoke from wildland and prescribed fires managed for resource benefits, consider alternative land treatments, and establish emergency action programs to mitigate the unavoidable impacts on the public. The Airshed Monitoring portion of the report describes how Federal Land Managers participate in a certified Smoke Management Program (e.g., Montana/Idaho State Airshed Group), and it describe how prescribed burns will be in line with the State certified Smoke Management Program Each airshed has an Airshed Coordinator who acts as the point of contact for the Airshed Group members operating within that airshed. Airshed members submit a list of planned burns to the SMU describing the type of burn to be conducted, the number of acres, as well as the location and elevation at each site. Burns are reported by "airshed," geographical areas with similar topography and weather patterns. The SMU and the Montana and Idaho Departments of Environmental Quality interact on the daily decisions that can restrict burning. Restrictions may be by airshed, elevation, or by

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		special impact zones around populated areas and are based on current and predicted smoke dispersion. The Flint Foothills project area is located on the northern edge of Montana Airshed 5 (Upper Clark Fork) and adjacent to the southern edge of Montana Airshed 3B.
Wildlife		
The FS must disclose its transparent, well thought-out long-term strategy for old-growth associated wildlife species viability in a properly defined cumulative effects analysis area.	1 and 12	The Wildlife section in the DEIS, p. 143. includes a discussion of old growth within the analysis area for each individual species and habitat. Forest Plan Vegetation Goal is to manage for old growth on a forest-wide basis and for old growth to be well-distributed across the Forest. The vegetation standard for old growth would result in no net loss of old growth structural characteristics in those areas entered for vegetation treatment. During development of the 2009 Forest Plan, species/habitat relationships were considered; analysis indicates there are no old-growth obligate wildlife species associated with old-growth types that occur on the Forest. Old growth habitat structural characteristics will be maintained at the project and planning area level.
Please demonstrate that this project will leave enough snags to follow the Forest Plan requirements and the requirements of sensitive old growth species such as flammulated owls and goshawks. Loggers are required	1 and 12	Management implications for snag resources and snag-

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to follow OSHA safety standards. Will these standards require snags to be cut down? After snags are cut down for safety for OSHA requirements will there still be enough snags left for old growth sensitive species?		dependent species are discussed in the Wildlife section of the DEIS, p. 145 and 156. Project design features and mitigation measures, starting on p.43 of the DEIS. require retaining adequate snag numbers to meet Forest Plan standards. In addition, design criteria require retaining snags in clumps to reduce the potential for windthrow and removal for safety reasons.
Specifically how will the Stonewall [Flint Foothills] Project affect Flammulated owls, cavity-nesters usually associated with mature stands of ponderosa pine and Douglas-fir?	1 and 12	The commenter is referring to a project on another Forest. The Wildlife section of the Flint Foothills DEIS, p.178 addresses the effects of proposed treatments on flammulated owl habitat.
Among other habitat characteristics, flammulated owls benefit from an abundance of large snags and a relatively dense under-story. The flammulated owl is a sensitive species in Region One, and is largely dependent on old ponderosa pine forests. According to a 2002 Region-wide assessment, not referenced in the 2003 FEIS for the Project, such forests only occur at 12-16% of their former, pre-fire suppression/pre-logging (that is, “historic”) levels, and thus species viability has been determined to be at risk. The Northern Region also recognizes that its strategy for restoring habitat for the flammulated owl and found in the Island South project that “in no way guarantees that flammulated owls will be restored to viable levels." Snag densities recommended by experts to support cavity-nesting birds range from 2.1 to 11 snags per acre of greater than 9” dbh. Please note that the fact that more recent science has called into question the lower snag densities cited in the earlier research, and the more recent science implies that about 4 snags per acre may be the minimum required to insure viability.	1 and 12	The commenter is referencing another project (“2003 FEIS for the Project”). The Wildlife section of Flint Foothills DEIS, p. 178 addresses the effects of proposed treatments on flammulated owl habitat. Treatments proposed under the Flint Foothills project would meet Forest Plan snag retention standards that require retaining from 3.6 to 8 snags > 15” d.b.h. per acre depending upon the vegetation category(table 46).
What surveys has the HNF [B-D] specifically designed to detect flammulated owls?	1 and 12	Surveys for flammulated owl presence were conducted in the project area during 2010 and 2011. The survey summary is provided in appendix F of the

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		DEIS.
The FS has not developed a conservation strategy for the flammulated owl in the BDNF, or in the Northern Rockies. Absent an appropriate landscape management strategy for insuring their viability, based upon the best available science, it is arbitrary and capricious to dismiss potential impacts on the ground where the FS has failed to conduct the kind of comprehensive surveys that would reveal their presence. This convenient excuse for not protecting for a species that is becoming exceedingly rare, a strategy of managing for extinction (since protection premised on detection affords greatest protection to the species that least need it) has been condemned by the FS's own leading expert in the northern region, Mike Hillis: With the exception of the Spotted Owl…, the U.S. Forest Service has not given much emphasis to owl management. This is contrary to the National Forest Management Act of 1976 (NFMA) which mandates that all wildlife species be managed for viable populations. However, with over 500 vertebrate species this would be difficult for any organization. Recognizing the absence of detailed information on owl habitat, the apparent association of owls with snags, mature, and old-growth timber (both rapidly declining), it seems inconsistent that the U.S. Forest Service has placed little emphasis on owl management. One might conclude that the agency's painful experiences with the Spotted Owl in Oregon and Washington have evolved into a 'hear no evil; see no evil' approach for other forest owls as well. Holt and Hillis, "Current Status and Habitat Associations of Forest Owls in Western Montana" (1987). State-of-the-art conservation biology and the principles that underlie the agency's policy of "ecosystem management" dictate an increasing focus on the landscape-scale concept and design of large biological reserves accompanied by buffer zones and habitat connectors as the most effective(and perhaps only) way to preserve wildlife diversity and viability (Noss, 1993). The FS has stated: "Well distributed habitat is the amount and location of required habitat which assure that individuals from demes,2 distributed throughout the population's existing range, can interact. Habitat should be located so that genetic exchange among all demes is possible." (Mealey 1983.)	1 and 12	Forest Plan FEIS (pg. 688) states that the "Conservation Assessment of the Northern Goshawk, Black-backed Woodpecker, Flammulated Owl, and Pileated Woodpecker in the Northern Region (Samson 2006) provides guidance for managing and assessing effects to flammulated owls. That assessment is supplemented by "Habitat Estimates for Maintaining Viable Populations of the Northern Goshawk, Black-backed Woodpecker, Flammulated Owl, Pileated Woodpecker, American Marten, and Fisher (Samson 2006).
Please examine how this project could affect grizzly bears, lynx and other species listed under the Endangered Species Act. Are you complying with lynx critical habitat requirements? Please examine how this project will affect all MIS and sensitive species.	1 and 12	Potential impacts to Threatened, Endangered, Candidate, Sensitive and MIS species and habitat are evaluated in the wildlife report and summarized in the Wildlife section of the DEIS p. 207
For the proposal to be consistent with the Forest Plan, enough habitat for viable populations of old growth dependent wildlife species is needed over the landscape. Considering potential difficulties of using population viability analysis at the project analysis area level (Ruggiero, et. al., 1994), the cumulative effects of carrying out multiple projects simultaneously across the BDNF makes it imperative that population viability be assessed at least at the forestwide scale (Marcot and Murphy, 1992). Also, temporal considerations of the impacts on wildlife population viability from implementing something with such long duration as a Forest Plan must be considered (id.) but this has never been done by the BDNF. It is also of paramount importance to	1 and 12	Species/habitat relationships were considered and species viability at the Forest scale was addressed in development of the 2009 Forest Plan.

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monitor population during the implementation of the Forest Plan in order to validate assumptions used about long-term species persistence i.e., population viability (Marcot and Murphy, 1992; Lacy and Clark, 1993). The U.S. District Court in Montana recently ruled in Native Ecosystems Council vs. Kimbell on the Keystone Quartz project that the Forest Service presented no hard data to support or demonstrate the biological impact on old-growth species viability across the forest of further reducing Douglas fir old-growth habitat below minimum forest plan standards, which themselves may be inadequate in light of more recent scientific information. Species in the Northern Region, including the BDNF, thought to prefer old-growth habitat for breeding or feeding include northern goshawk, flammulated owl, pileated woodpecker, black-backed woodpecker (after wildfire or beetle epidemic), fisher, marten, Canada lynx, and wolverine. For the BDNF, sensitive old-growth dependent species include the northern goshawk and flammulated owl. According to official FS policy, the BDNF "must develop conservation strategies for those sensitive species whose continued existence may be negatively affected by the forest plan or a proposed project." FSM 2670.45. These strategies would address the forest-wide and rangewide conditions for the affected species, allowing site-specific viability analysis to be tiered to the forest-wide viability analysis, and would establish quantifiable objectives for the affected species. These strategies must be adopted prior to implementation of projects that would adversely impact sensitive species habitat. FSM 2622.01, 2670.45.		In addition, the Forest Plan FEIS (pg. 688) states that the "Conservation Assessment of the Northern Goshawk, Black-backed Woodpecker, Flammulated Owl, and Pileated Woodpecker in the Northern Region (Samson 2006) provides guidance for managing and assessing effects to flammulated owls. That assessment is supplemented by "Habitat Estimates for Maintaining Viable Populations of the Northern Goshawk, Black-backed Woodpecker, Flammulated Owl, Pileated Woodpecker, American Marten, and Fisher (Samson 2006), Treatments proposed under this project would not result in a reduction of old growth forest acres, Vegetation section of the DEIS, starting on page 88.
We are concerned about the status of the goshawk on the BDNF. Please define the current and proposed status of this species by the current best science as per the Southwest goshawk guidelines. We would like to know the habitat conditions for this species by each of the 6 structural stages outlined in those guidelines, since the Region 1 goshawk habitat criteria are too general to adequately define goshawk habitat.	3	The Northern Goshawk Northern Region Overview (2009) states that VSS diameter classes described in the "Management Recommendations for the Northern Goshawk in the Southwestern United States" (Reynolds et al. 1992) are not readily comparable to the diameter classes present in Region 1, and that it was necessary to combine VSS classes 4, 5, and 6 (Reynolds et al. 1992) into one size class (>

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		10” d.b.h.) to compare and reflect mature and older forest in Region 1.
Please define how the project will affect populations of two key prey species for various predators. These prey species include the red squirrel and snowshoe hare. Please define how these prey species will be managed and their viability ensured in the project area over time.	3	The DEIS discusses winter snowshoe hare habitat within the project area, Wildlife section, pp. 229-231. While other species prey on snowshoe hares, the analysis is based on Forest Service Northern Region Lynx Standards and Guidelines. Both snowshoe hare and red squirrels are addressed as goshawk prey species (Wildlife section, DEIS, p. X)
How will the management impacts on snag-associated wildlife, which includes about 25% of the forest bird fauna, be monitored? If a snag proxy will be used to estimate population effects, please define how the validity of this proxy has been determined to ensure its effectiveness.	3	Snag numbers would be monitored as one component measured to determine current condition and trend for key vegetation characteristics of vegetation diversity at the Forest level. Forest Plan monitoring for snags is done at 5-year intervals using FIA (or other) data to monitor snags Forest-wide. (Refer to Chapter 5 of the Forest Plan.
We are concerned about the lack of snags and snag recruitment within clearcuts. This is basically a permanent removal of habitat for snag-associated wildlife. Please define how these "black holes" for snags affect associated species across this landscape.	3	Snag numbers would be retained according to Forest Plan snag standards. All treatments would retain all live trees greater than 20” d.b.h. Additional green trees would be retained for future snag recruitment according to Forest Plan standards, DEIS, p. 95, 156, and appendix E.

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What is the expected snag recruitment within commercial thin units? How much will snag habitat and size be reduced over the long term due to thinning, and how much will snag-associated species be reduced as a result?	3	Snag recruitment through time after commercial thinning has not been modeled. The vegetation analysis in the DEIS, p. 95 states that post-treatment stand structure in commercially thinned stands would be similar to what would have been created in the 20-year interval fire disturbance regime historically.
How much of the landscape can have reduced snag habitat before significant reductions in associated species occur? What level of this loss of habitat currently exists, and what is the estimated "threshold level" of non-habitat before snag-associated wildlife populations experience significant losses of population levels in the affected landscape?	3	Potential black-backed woodpecker habitat from the Northern Region viability model is estimated at 395,316 acres for the BDNF as of 2008 (Bush and Lundberg 2008). Samson (2006) showed that 29,405 acres constitutes minimum viability threshold for the Northern Region as a whole. Minimum viable threshold identified for flammulated owls for the Northern Region is approximately 4,700 acres (Samson 2006). Habitat modeling shows that the Northern Region contains 184,952 acres of suitable flammulated owl habitat, of which 7,321 acres occur on the BDNF (Bush and Lundberg 2008).
How is the availability of larger snags on the BDNF affecting snag-associated wildlife at this time?	3	Large snags are well-distributed on the BDNF with lower numbers noted in the Upper Clark Fork landscape (Forest Plan FEIS, pgs. 495-496). Snags equal to or greater than 10” d.b.h. average

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		4.3 per acre in the Clark Fork-Flints landscape.
What level of wildlife surveys will be done for the goshawk, pileated woodpecker, great gray owl and flammulated owl to ensure that all currently occupied suitable nesting habitat for these species is identified and protected in this project?	3	Surveys were conducted in priority areas associated with proposed treatments for flammulated owl, black-backed woodpecker, and great gray owls. Historic nest surveys were conducted for goshawks DEIS appendix F, and the Wildlife Report, appendix B, in the project file. Pileated woodpeckers are not a sensitive species on the BDNF; no surveys were conducted for this species.
Please define what the conservation strategies will be for the pileated woodpecker, and how this compares to the current best science for this species as per published literature.	3	The 2009 Forest Plan developed objectives for managing wildlife habitat and determined that implementation of the Plan would not reduce viability for wildlife species. The pileated woodpecker is not an R1 sensitive species and is not identified as having a viability concern in the Region. The conservation assessment completed by Samson (2006) determined that short-term viability for pileated woodpeckers is not an issue in the Northern Region.
Please define the conservation strategies for various species of concern, including songbirds, in the project area, and how population declines will be avoided as a result of this project. What conservation practices will be implemented to meet the Memorandum of Understanding for migratory bird species?	3 3	Forest Plan wildlife objectives tier to management plans, conservation strategies, and conservation assessments as information sources to consider

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		when designing projects that may affect sensitive or federally listed species. Migratory birds are addressed in the Wildlife section of the DEIS, p. 231. The analysis addresses effects to species identified by USFWS as Birds of Conservation Concern (BOCC) and project effects in relation to elements contained in the USFWS-FS migratory bird MOU.
How will forest thinning as well as clearcutting affect habitat for wildlife species that require large amounts of coarse woody debris, such as the pine marten and red-backed vole. What is the specific habitat management direction for these two species that will ensure viability within the project area?	3	American marten and red-backed vole are not federally listed species and are not species identified in the Northern Region as having a viability concern (i.e. sensitive species). Project activities would conform to Forest Plan standards for retaining large woody debris.
Please define elk security by the COMPLETE Hillis definition before and after logging.	3	The Wildlife section in of DEIS, p.212 discloses the effects to elk secure areas (hunting season) using Forest Plan direction that was based on management recommendations from Christensen et al. (1993), Wisdom (2004) and the Yellowstone Grizzly Bear Amendment (USDA Forest Service 2006) for the same reasons disclosed in the Forest Plan FEIS (pp. 488-489, 513-517, 684-685 and 697). Christensen et al. (1993) considered Hillis et al. during development of their recommendations and considerations.

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		Also see Rohrbacher 2011 in appendix F of the DEIS for more analysis of other science and rationale for selection of secure areas (as measured by OMRTD) as the preferred analysis method.
Please define habitat effectiveness for elk before and during logging.	3	The Wildlife section of the DEIS, p. 212, addresses wildlife security habitat and Open Motorized Road and Trail Densities (OMRTDs) before, during, and after implementation.
Please map big game winter range, calving grounds, and fall security areas in the project area.	3	Elk winter range and fall secure areas are mapped in the Wildlife section of the DEIS, figure 35, p. 210. Elk calving grounds are not mapped, but are addressed in the wildlife analysis.
The BDNF does not provide for management of lynx habitat as per the Forest Plan Amendment. However, since this is historic lynx habitat, the direction in the Northern Lynx Management Direction Amendment should be applied, including to areas planned for precommercial thinning.	3	Current direction for unoccupied forests is to consider lynx direction using the Northern Region Lynx Direction table with standards and guidelines. This has been done, as shown in the Wildlife section of the DEIS, pp. 223 and in appendix F of the DEIS. Vegetation standard S5 applies to precommercial thinning and generally restricts precommercial thinning that reduces winter snowshoe habitat (with a few listed exceptions).
New mapping of lynx habitat may be required in the future on the BDNF, to ensure that habitat conditions remain suitable for lynx on these lands in the future. The project area could be fall under the management constraints in the future, so that this project should not go forward until this issue is resolved.	3	The status and scheduling of future mapping of lynx habitat on the BDNF is unknown. The Flint Foothills wildlife analysis utilized

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		the most current lynx habitat model.
Please define where the movement corridors are going to be maintained for migration of grizzly bears along this landscape.	3	The Forest Plan contains goals and objectives pertaining to wildlife movement and linkages via maintaining and consolidating FS ownership at highway and road crossings, and providing secure habitat. Summer and fall season secure habitat as well as OMRTD goals and objectives are identified in the Forest Plan and addressed in the Wildlife section of the DEIS, pp. 158-170.
Please evaluate the impact of large openings on wildlife, including snag-associated wildlife and forest interior species.	3	The Wildlife section of the DEIS, p. 176, addresses effects of large openings for black-backed woodpecker, great gray owl, and migratory birds (i.e. olive-sided flycatcher).
The information in the scoping package indicates that timber harvest will occur on 2,322 acres and 2,230 acres will be burned. Most birds nest in the brush, trees, or on the ground. Harvesting timber and/or burning brush where birds nest is guaranteed to kill individual birds and/or destroy their nesting habitat. There are 836 species of birds protected under the Migratory Bird Treaty Act. See 50 CFR 10.13 for a complete listing. Also see: http://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/mbtandx.html Many birds protected under the Migratory Bird Treaty Act of 1918 exist in the forests of North America. Using the link to the bird species protected under the Migratory Bird Treaty Act *(see link in literature review)* please indicate in the EA the bird species that exist in the project area or have habitat in the project area. If there are no protected bird species that exist in the project area or have habitat in the project area, please indicate this in the final EA.	4	The Wildlife section in the DEIS, p. 170 and 231 addresses direct and indirect effects to a number of bird species that may occur within the project area, including sensitive species as well as migratory birds identified by USFWS as Birds of Conservation Concern.
There are countless natural resources in a forest besides merchantable-sized conifers. Trees burn in wildfires. This has been happening for thousands of years. We still have mature forests and properly functioning natural resources in those forests given the fact that each acre of forest has burned several of times in the past. The natural resources in the national forests will be rejuvenated by wildfire. Some species of mammals and birds depend on wildfire which creates unique habitat unavailable at any other time. These	4	Thank you for your comment. The DEIS acknowledges the role of fire in shaping vegetation structure and composition on the landscape, Vegetation section of

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fire benefits are the basis for the agency policy to allow fire to play its natural role in the backcountry.		the DEIS, p.95. The purpose and need of this project, DEIS, p.4 does not include an objective to alter fire regimes or reduce fuels.
Please don't use my tax dollars to stop a beneficial natural disturbance event. Some trees die in a fire. These dead and dying trees benefit certain bird and mammal species that exist in the Powell Divide project. *(see Opposing Science Attachment #8 in literature review*)	4	The Wildlife section in the DEIS, p.143, addresses the effects to certain bird and mammal species in the no action and action alternatives. We have no knowledge of a project in the vicinity of the Flint Foothills project area called the Powell Divide project. Literature cited in the Opposing Science Attachments is reviewed in table B-2 in appendix B.
We note again that a number of the units will exceed 40 acres in size. Please provide a complete analysis in the draft EIS as to how these large openings will impact wildlife.	13	The rationale for creating large openings was to encompass past disturbance patterns that created the original area proposed for treatment, Vegetation section of the DEIS, p. 64. The Wildlife section of the DEIS, pp. 176 addresses effects of large openings for black-backed woodpecker, great gray owl, and migratory birds (i.e., olive-sided flycatcher).
How much habitat for these species has been lost due to past logging, how much habitat remains~ and what is the impact of this reduced habitat on their populations in regards to whether or not remaining forests are providing sink or source habitat.	13	Past timber harvest, in addition to other past activities, has been addressed for wildlife species as part of the existing condition, Wildlife section of the DEIS, p. 143. Existing suitable habitats are expected to function as source habitats because they contain

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		characteristics expected to support species life history requirements.
Please define how the proposed logging of old growth will affect wildlife species that use old growth habitat	13	The effects of timber harvest in old growth stands is addressed for a number of species in this analysis in the Wildlife section of the DEIS, p. 143.
Please define the impact of the project on the goshawk, an indicator for forest interior wildlife, as per the southwest goshawk guidelines, and use their vegetation structural stages.	13	The Wildlife section of the DEIS, starting on p. 217 addresses effects to northern goshawk. The Northern Goshawk Northern Region Overview (2009) states that VSS diameter classes used by Reynolds et al. (1992) are not readily comparable to the diameter classes present in Region 1, and that it was necessary to combine VSS classes 4, 5, and 6 (Reynolds et al. 1992) into one size class (> 10" d.b.h.) to compare and reflect mature and older forest in Region 1.
Please map all the known goshawk territories; and define the current and expected level of habitat in each territory	13	The analysis for effects to goshawk includes measure of available habitat within the project area. Individual territory and home range boundaries are not identified for this species within the project area.
Please define the impact of both clear cutting and commercial thinning on goshawk prey species as per the current best science and any forest monitoring data.	13	Timber harvest effects to snowshoe hare and red squirrel as goshawk prey species are addressed in the Wildlife section of the DEIS, pp. 219.

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Please provide a summary of the status of the goshawk population trend and productivity within the project area and the Beaverhead Deerlodge National Forest.	13	The northern goshawk was removed from the Region 1 sensitive species list in 2007 based on based on best available scientific information concerning ecological status, amount and distribution of habitats, grid-based species inventory. The 2005 Region-wide goshawk survey, in combination with known active nest sites from 2000-2004 indicate that goshawks are well-distributed across the BDNF. Long-term monitoring of goshawk population nesting and productivity has been conducted by Jack Kirkley, University of Montana-Western since 1998 in the southwestern portion of the BDNF on the Dillon, Wisdom, and Wise River Ranger Districts. Successful fledging of young in active territories varied annually, ranging from 33% to 84% from 2000 to 2005. Population trend was not analyzed. Clough (2000) reported on goshawk productivity over two years in the north Flint Creek Range, a portion of which encompassed the project area. Annual productivity varied between years, averaging a mean of 2.56 young fledged per nest from 18 nests monitored.
Please address what the expected impact has been on the goshawk from all the previous logging in the project area and across the forest.	13	Past timber harvest has been incorporated into the evaluation of existing suitable and unsuitable habitats for goshawk in the

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		Wildlife section of the DEIS, starting on page 217.
What is the conservation strategy for the flammulated owl in the project area? What is the estimated effectiveness of this strategy as per the current best science?	13	Forest Plan FEIS (pg. 688) states that the "Conservation Assessment of the Northern Goshawk, Black-Backed Woodpecker, Flammulated Owl, and Pileated Woodpecker in the Northern Region (Samson 2006) provides guidance for the assessment and management of effects to flammulated owls. That assessment is supplemented by "Habitat Estimates for Maintaining Viable Populations of the Northern Goshawk, Black-backed Woodpecker, Flammulated Owl, Pileated Woodpecker, American Marten, and Fisher (Samson 2006).
Since snag numbers are very low, relative to the entire forest, in the Flint Uplands area, what is this cumulative impact on forest wildlife associated with snags currently estimated to be? Where are sillk [sink] areas expected to occur both now, and after logging? What percentage of the landscape can be sink habitat before viability of snag-associated \\·lldlife is lost in this landscape?	13	The Forest is not aware of snag density analyses conducted specifically for the Flint Uplands Management Area. Activities proposed within the Flint Uplands Management Area under this project total 84 acres and consist of precommercial thinning activities that are not expected to impact snag availability. We are assuming the commenter is referring to the Clark Fork-Flints landscape. Cumulative effects to those cavity-nesting species addressed in the wildlife specialist report is provided in the DEIS.

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		The wildlife analysis in the DEIS does not analyze habitats as potential population sinks. Instead, the analysis classifies habitats as suitable or unsuitable to support a given species before and after project implementation.
Since the Forest Plan does not require that any harvest units have any snags, please define how the impact of logging will be monitored on wildlife dependent upon snags.	13	Forest Plan snag standards require retention of snags within treatment units if an area-wide snag analysis has not been completed. No areawide assessment has been completed for this project.
Since there is no MIS for snags, specifically how is the impact of past and planned logging going to be determined for snag-associated wildlife? Will this methodology be scientifically valid?	13	The DEIS describes areas that may currently be snag-deficient due to past logging, Vegetation section of the, DEIS p. 95. Current and foreseeable projects would adhere to Forest Plan snag retention standards.
As noted before, please include a conservation strategy for woodpecker management areas in all action alternatives, as *per* the current best science.	13	Conservation strategies are best completed for the population as a whole, because usually the entire population does not reside solely in the project area. The Forest Plan FEIS (pg. 688) states that the “Conservation Assessment of the Northern Goshawk, Black-backed Woodpecker, Flammulated Owl, and Pileated Woodpecker in the Northern Region (Samson 2006) provides guidance for managing and assessing effects to these species. That assessment is

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		supplemented by "Habitat Estimates for Maintaining Viable Populations of the Northern Goshawk, Black-backed Woodpecker, Flammulated Owl, Pileated Woodpecker, American Marten, and Fisher (Samson 2006), and other sources pertaining to raptor and carnivore guidance,
The wildlife rationale for burning forests was not identified in the scoping notice. How is this proposed burning expected to affect wildlife. Please include an analysis of prescribed burning on wildlife in your NEPA analysis.	13	The effects of prescribed burning on wildlife are addressed in the Wildlife section of the DEIS, p. 165.
Please define the habitat effectiveness of big game habitat DURING logging in the summer, including all roads with motorized activity.	13	The Wildlife section of the DEIS, starting on page 208, addresses big game secure habitat and Open Motorized Road and Trail Densities (OMRTDs) before, during, and after implementation.
Please analyze and map the acres of big game security as per the Hills et al 1991 definition before and after logging.	13	The Wildlife section of the DEIS, starting on page 208 discloses the effects to elk secure areas (hunting season) using Forest Plan direction that was based on management recommendations from Christensen et al. (1993), Wisdom (2004) and the Yellowstone Grizzly Bear Amendment (USDA Forest Service 2006) for the same reasons disclosed in the Forest Plan FEIS (pp. 488-489, 513-517, 684-685 and 697). Christensen et al. (1993) considered Hillis et al. during development of their recommendations and

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		considerations. Also see Rohrbacher 2011 in appendix F of the DEIS for more analysis of other science and rationale for selection of secure areas (as measured by OMRTD) as the preferred analysis method.
The rationale for the project which includes reducing stand density was not supported with any reasons why this should be achieved. The rationale should include a recognition that forest thinning will be highly detrimental to wildlife, and a discussion provided as to why these detrimental impacts will be justified by some other benefit.	13	The rationale for proposed treatments is tied to the purpose and need, DEIS, p.4. Effects to wildlife species are addressed in the Wildlife section of the DEIS, p. 143.
Since the Beaverhead-Deerlodge National Forest is considered occupied lynx habitat, the agency needs to complete formal consultation with the USF\VS on management of this occupied habitat before any site specific projects of the Forest Plan are implemented.	13	The Beaverhead-Deerlodge National Forest is considered unoccupied at this time. Lynx are not listed on the species list from the USFWS (USDI Fish and Wildlife Service 2012). Lynx have been analyzed according to regional direction (USDA Forest Service 2009), but no consultation with the USFWS is required.
According to the NRLMD, many of the proposed actions will violate the NRL11D, including pre-commercial thinning.	13	Current direction for unoccupied forests is to consider lynx direction using the Northern Region Lynx Direction table with standards and guidelines. This has been done, as shown in the wildlife appendix F. Vegetation standard S5 applies to precommercial thinning and generally restricts precommercial thinning that reduces winter snowshoe habitat (with a few listed exceptions).

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There are currently no management indicator species for snags, old growth, forest interior habitat, and neotropical migratory bird habitat. The agency has no means of monitoring the impact of past and future logging projects on almost all wildlife species as a result, in violation of the NFMA.	13	NFMA regulations do not require that management indicator species (MIS) be selected for all habitat types or vegetation management activities. MIS were selected during Forest Plan Revision; the forest planning record includes documentation of the rationale for selection of MIS.
What is the trend of the goshawk population in the project area and across the Forest?	13	The northern goshawk was removed from the Region 1 sensitive species list in 2007 based on based on best available scientific information concerning ecological status, amount and distribution of habitats, and grid-based species inventory. The 2005 Region-wide goshawk survey, in combination with known active nest sites from 2000-2004 indicate that goshawks are well-distributed across the BDNF. Long-term monitoring of goshawk population nesting and productivity has been conducted by Jack Kirkley, University of Montana-Western since 1998 in the southwestern portion of the BDNF on the Dillon, Wisdom, and Wise River Ranger Districts. Successful fledging of young in active territories varied annually, ranging from 33% to 84% from 2000 to 2005. Population trend was not analyzed. Clough (2000) reported on goshawk productivity over two years in the north Flint Creek Range, a portion of which

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		encompassed the project area. Annual productivity varied between years, averaging a mean of 2.56 young fledged per nest from 18 nests monitored.
Since the goshawk was dropped an a management indicator species for the Forest in the plan revision, what monitoring data obtained during that planning period indicated that this species was a poor indicator of forest interior habitat, to justify dropping this MIS?	13	Rationale for selection of MIS is contained in the Forest Plan FEIS (pg. 34).
How will impacts of wildlife requiring relatively dense, undisturbed forests, including forests with good populations of red squirrels, be met in the project area to ensure viability?	13	Effects to red squirrels are addressed as goshawk prey species in the Wildlife section of the DEIS, p. 219.
Roadless		
Please utilize the NEPA process to clarify any roadless boundary issues. Please examine if these unroaded areas adjacent to roadless areas have wilderness qualities.	1 and 12	The 2001 Roadless Area Conservation Rule (RACR) formalized the boundaries of earlier Forest Plan Inventoried Roadless Areas boundaries, through electronic maps developed nationally in 1999. The wilderness attributes of the Roadless and unroaded analysis for this project is addressed in the Roadless section of the DEIS starting on page 359.
Increases in noxious weeds within IRAs is a violation of the roadless area conservation rule.	3	Thank you for your comment. There are no proposed treatment units with IRAs. The Roadless Area Conservation Rule does not direct management of invasive species. The roadless rule does indirectly influence the prevention of invasive species spread by limiting the construction of roads in Inventoried Roadless Areas.

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Aquatic Species/Hydrology/Water Quality/Riparian Areas/Soils		
Aquatic Species		
We request a careful analysis of the impacts to fisheries and water quality, including considerations of sedimentation, increases in peak flow, channel stability, risk of rain-on-snow events, and increases in stream water temperature. Please disclose the locations of seeps, springs, bogs and other sensitive wet areas, and the effects on these areas of the project activities. Where livestock are permitted to graze, we ask that you assess the present condition and continue to monitor the impacts of grazing activities upon vegetation diversity, soil compaction, stream bank stability and subsequent sedimentation. This watershed has been proposed as bull trout critical habitat. Will you meet the requirements of bull trout critical habitat?	1 and 12	The environmental analysis for this project will identify sources of sedimentation, identify where there are flow increases as a result of the project, identify impacts to stream channels as a result of the project, and identify and analyze changes in stream temperature as a result of the project. Springs, seeps and other wet areas will be identified and protected. This project will not analyze the effects of livestock grazing, but will consider on-going impacts as they relate to this project. The Hydrology section of the DEIS analyzes effects to water quality, water quantity and floodplains and wetlands beginning on page 279. The Aquatics section of the DEIS, addresses the aquatic MIS and the effects to sensitive aquatic species beginning on page 317. Bull trout have not been identified in watersheds within the project area. Bull trout critical habitat has not been proposed within the planning area

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		Post implementation monitoring would be done consistent with Forest Plan Monitoring and Evaluation outlined in the Forest Plan, pp. 271-280, including impacts of grazing. Typically, each timber sale is reviewed for implementation and effectiveness of project design features and mitigation measures, as well as resource issues important to the individual sale.
Please disclose in the NEPA document the results of up-to-date monitoring of fish habitat and watershed conditions and how this project will affect the fish in the project area.	1 and 12	The Aquatics Species section of the DEIS identifies and discloses current stream conditions and effects to sensitive aquatic species in the project area beginning on page 318. Past monitoring information is on file at the Beaverhead-Deerlodge National Forest.
Your plans will kill the trout. Besides putting toxic chemicals into the streams that are their home, you are also raising the 98igantean98s and causing erosion when you cut trees.	8	The Hydrology section of the DEIS discusses sediment delivery and effects to stream temperatures starting on page 279. The project design includes RCA buffers along all stream channels to protect from sediment and increases in temperatures. The Aquatic Species section of the DEIS, p. 322 discusses effects to sensitive aquatic species. Treatment of noxious weeds would be consistent with direction found in the

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		Beaverhead-Deerlodge Noxious Weed Control Record of Decision (2002).
Hydrology		
Water Quality		
It is extremely important the FS disclose the environmental baseline for watersheds. Therefore, proper disclosure of baseline conditions would mean estimates of stream stability, pool frequency conditions, and water temperature range—essentially the values of Riparian Management Objectives along with such parameters as sediment levels. Generally, this means their condition before development or resource exploitation was initiated. For example, the baseline condition of a stream means the habitat conditions for fish and other aquatic species prior to the impacts of road building, logging, livestock grazing, etc. When such information is provided, comparison with the current conditions (after impacts of development) will aid in the assessment of cumulative effects of all alternatives.	1 and 12	The Hydrology section of the DEIS, p.273, discloses the existing, (baseline) conditions) and effects on riparian conservation area.
Watershed enhancement can be particularly important where there are water quality impaired streams listed under Section 303(d) of the Clean Water Act in a project area. There appear to be several water quality impaired waterbodies listed on the Montana Dept. of Environmental Quality's (MDEQ's) Clean Water Act Water Quality Assessment Database in the project area, including Flint Creek itself (see http://cwaic.mt.gov/query. aspx). There may be additional water quality impaired streams within the project area. It is likely that activities proposed with the Flint Foothills Vegetation Management have potential to affect sediment/siltation and turbidity impairments in project watersheds. There appear to be several water quality impaired waterbodies listed on the Montana Dept. of Environmental Quality's (MDEQ's) Clean Water Act Water Quality Assessment Database in the project area, including Flint Creek itself (see http://cwaic.mt.gov/query. aspx). There may be additional water quality impaired streams within the project area. It is likely that activities proposed with the Flint Foothills Vegetation Management have potential to affect sediment/siltation and turbidity impairments in project watersheds. It is important that all water quality impaired waterbodies within the project area be identified. It is not clear which TMDL Planning Area the proposed project may affect since the NOI included little information on watersheds in the project area, although it is likely that the Flint Creek TMDL Planning Area will be affected. It is important that all water quality impaired waterbodies within the project area be identified. It is not clear which TMDL Planning Area the proposed project may affect since the NOI included little information on watersheds in the project area, although it is likely that the Flint Creek TMDL Planning Area will be affected. It is important that the proposed project not cause further degradation of impaired waters, and that project activities be consistent with the MDEQ's development of Total Maximum Daily Loads (TMDLs) and Water Quality Restoration Plans to improve water quality and restore full support of beneficial uses in the water quality impaired streams that may be impacted by the project.	11	The Hydrology section of the DEIS, p 279, discloses the effects of this project on water quality. All streams with water quality impairment are identified. No further degradation of water quality in project streams is expected. Project design features (chapter 2) for this project are designed to prevent sedimentation that would result from project activities. The stream segments identified in the comment are outside of the project area.

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We recommend that the Beaverhead-Deerlodge NF coordinate with MDEQ TMDL program staff to assure consistency of proposed management actions with TMDLs and Water Quality Restoration Plans prepared by MDEQ (contact MDEQ staff such as Mr. Mark Kelley at 406-444-3508, Mr. Dean Yashan at 406-444-5317, and/or Mr. Robert Ray at 406-444-5319).	11	Thank you for your offer of assistance.
Special attention should be made regarding Montana's identification of water bodies with impaired uses in their Clean Water Act Section 303 (d) report. The EIS should identify water bodies in the analysis area listed by the Montana Dept. of Environmental Quality (MDEQ) as water quality impaired under Section 303(d) of the Clean Water Act (see http://cwaic.mt.gov/), as well as the magnitude and sources of such impairment. For example two segments of Flint Creek are listed as water quality impaired. A 28.1 mile Flint Creek segment from Georgetown Lake to the confluence with Boulder Creek (Waterbody ID MT76E003_011) is listed as water quality impaired due to non-support of aquatic life, cold water fishery, and drinking water uses, and partial support of primary contact recreation. Probable causes of water quality impairment are listed as metals (antimony, arsenic, cadmium, copper, lead and mercury), alteration in stream-side or littoral vegetative covers, low flow alterations, and sedimentation/siltation, and probable sources of impairment are identified as abandoned mine lands (inactive), agriculture and grazing in riparian zones.	11	Table 75 on page 267 lists water quality impaired streams. The effects of this project on water quality are disclosed. No further degradation of water quality in project streams is expected. Project design features for this project, DEIS p. 43, are designed to prevent sedimentation as a result of the project activities. The stream segments listed in the comment are outside of the project area.
A downstream 16.9-mile Flint Creek segment from Boulder Creek to the confluence with the Clark Fork River (Waterbody ID MT76E003J312) is also listed as impaired due to non-support of aquatic life, cold water fishery, and drinking water uses, and partial support of primary contact recreation and industrial uses. Probable causes of impairment are listed as metals (arsenic, cadmium, copper, iron and lead), alteration in stream-side or littoral vegetative covers, nitrogen, phosphorus and turbidity, and probable sources of impairment are identified as abandoned mine lands (inactive), agriculture, grazing in riparian zones, and streambank modifications and/or 100igantean100s100ion.	11	TMDL-limited streams within the project area are addressed in the Hydrology section of the DEIS, p. 279. The stream segments listed in the comment are outside of the project area.
Piease note that the Watershed Management Section (WMS) at DEQ is currently developing sediment Total Maximum Daily Loads (TM DLs) for this watershed. The WMS anticipates that these TMDLs will be complete this year. The WMS notes that during the development of these sediment TMDls it was apparent that fire timber salvage activities from nearly ten years ago have likely increased upland erosion in the Upper Smart Creek and the South Fork Willow Creek. This was due to drag line routes and off-road heavy equipment pathways in the watershed (see the attached photo).	15	TMDL-limited streams within the project area are addressed in the Hydrology section of the DEIS, p. 279. The stream segments listed in the comment are outside of the project area.
The WPS requests that the B-D National Forest addresses how they will minimize upland erosion during the proposed project.	15	The Disturbed WEPP model was run to generate predicted erosion rates for the existing condition and following implementation of the proposed harvest. The

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		analysis action that probability of erosion would increase in one unit, 73S, from 0% to 2%. However, model results for the proposed action indicate an average annual erosion rate of 0 tons/acre/yr. for each modeled harvest unit. The Region 1 Soils Quality Standards (SQS) S state that the tolerable soil loss rate (average annual) is generally less than 1 to 2 tons per acre per year (USDA Forest Service, 1999). Based on the WEPP modeling, SQS for surface erosion would continue to be met The WEPP results do not take into account PDFs listed in the mitigation measure section; in particular, providing drainage control and slash placement on skid trails. These PDFs will ameliorate disturbance associated with harvest, reduce erosion potential, and hasten soil, DEIS. p.43.
Riparian Areas We note that temperature effects from riparian canopy/shade removal can persist downstream for significant distance in some small stream systems (e.g., up to 10km). It is important that proposed activities be consistent with the riparian management objectives described in the ICB Strategy, which include: * Achieve physical integrity of aquatic ecosystems; * Provide an amount and distribution of woody debris sufficient to sustain physical and biological complexity; * Provide adequate summer and winter thermal regulation;	11	All Forest Plan standards will be met, including those associated with RCAs. The Forest Plan Consistency Checklist is provided in appendix C. The Hydrology section of the DEIS, starting on page 279 shows that water quality

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* Provide appropriate amounts and distributions of source habitats for riparian- or wetland-dependent species; and * Restore or maintain water quality and hydrologic processes. * Restore or maintain naturally functioning riparian vegetation communities.		would be improved by implementing either action alternative. No vegetation activities are proposed in the RCAs; newly constructed temporary road in the RCAs, 0.5 miles, would be obliterated following implementation of the vegetation activities.
Additionally, DEQ would like to promote the Forest Service's adherence to Inland Fish Strategy (INFISH) riparian guidelines to assure streams are not at risk of increased temperatures or sedimentation due to the proposed activities.	15	Thank you for your comment and support. The project is consistent with all Forest Plan RCA standards, see the Forest Plan Consistency Checklist, appendix C.
Soils		
Prescribed fires and mechanical treatments may adversely affect soil productivity. NFMA requires the FS to "not allow significant or permanent impairment of the productivity of the land." [36 C.F.R. § 219.27(a)(1).] NFMA requires the Forest Service to "ensure that timber will be harvested from National Forest System lands only where—soil, slope, or other watershed conditions will not be irreversibly damaged." [16 U.S.C. 1604 (g)(3)(E).] The Sheep Creek Salvage FEIS (USDA Forest Service, 2005a) states at p. 173: Noxious weed presence may lead to physical and biological changes in soil. Organic matter distribution and nutrient flux may change dramatically with noxious weed invasion. Spotted knapweed (Centaurea biebersteinii D.C.) impacts phosphorus levels at sites (LeJeune and Seastedt, 2001) and can hinder growth of other species with allelopathic mechanism. Specific to spotted knapweed, these traits can ultimately limit native species' ability to compete and can have direct impacts on species diversity (Tyser and Key 1988, Ridenour and Callaway 2001).	1 and 12	The EIS cited was completed for the Sheep Creek fire salvage project on the Wisdom Ranger District. Although the research papers address spotted knapweed effects in grassland plant communities (versus forested communities), the papers cited in the Soils section of the DEIS, p. 236 are still relevant to the Flint Foothills project. LeJeune and Seastedt (2001) reviewed the literature along with their own unpublished data and state that based on preliminary evidence, it appears that knapweed is a strong competitor for phosphorous and water, and is able to do well in grasslands once limited by nitrogen. Nitrogen is no longer a limiting resource due to

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		increased anthropogenic disturbances over the past century that has made nitrogen more available (through reduced fire frequency, atmospheric deposition of nitrogen, and possibly direct and indirect fertilization from grazing). Phosphorous and water are the new limiting resources and knapweed does well in competing for them. Tyser and Key (1988) performed a study in Glacier National Park and found spotted knapweed could invade native fescue grasslands. Further, they found an inverse relationship between knapweed stem density and species richness and frequency of several species, and concluded that knapweed has the ability to alter plant community composition. Ridenour and Calloway (2001) performed a greenhouse study to determine the allelopathic affects that spotted knapweed has on Idaho fescue. They found that spotted knapweed reduces Idaho fescue growth primarily through allelopathy but also through resource competition (nutrients, space, water). While the potential for impacts to soil productivity exists as a result of noxious weed infestation, the actual impact to long term soil productivity is likely minimal, due

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		to the following: The Invasive Plant resource report describes a low risk of noxious weeds becoming established and/or spreading in proposed treatment units within the analysis area. The mitigation measures listed in the DEIS include monitoring for and treating noxious weeds within units and along roads. Treatment of noxious weeds with herbicides on the Beaverhead-Deerlodge NF has been effective (infested acres reduced by 49% over the last ten years on the Pintler Ranger District) (Rasor 2012).
Please provide estimates of current detrimental disturbance in all previously established activity areas in the watersheds affected by the proposal. Please disclose the link between current and cumulative soil disturbance in project area watersheds to the current and cumulative impacts on water quantity and quality. Please disclose if there are any WQLS streams or TMDL streams in the project area. Please disclose measures of, or provide scientifically sound estimates of, detrimental soil disturbance or soil productivity losses (erosion, compaction, displacement, noxious weed spread) attributable to offroad vehicle use.	1 and 12	Soil cumulative effects occur only when soil impacts from multiple management activities occur on the same location. Therefore, only the activity areas associated with the proposed action were analyzed for existing soil disturbance plus any additional disturbance expected from the proposed action. The FS does not analyze soil disturbance at the watershed scale because soil disturbance analysis, as assessed under the Northern Region Soil Quality Standards (USDA Forest Service 1999), is a site specific, activity area approach. Therefore, we use

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		a harvest unit as the analysis area so that we can determine the effects of the harvest activity on the soil resource. Since DSD is a percent of the area, if we were to do an assessment of existing DSD at the watershed scale and then estimate the increase due to the project, we would show no increase. Additionally, due to the inherent variability of soil properties such as texture, organic matter and surface cover, and the variable soil response to previous management activities, it is not feasible to analyze past management effects at the landscape scale in a meaningful way. Existing detrimental soil disturbance (DSD) was determined by Forest Service soil scientists with onsite visits to each timber harvest unit is included in the Soils section of the DEIS, table 69 p. 243. No DSD attributable to offroad vehicle use was noted. The Hydrology section of the DEIS, p. 267 table 75 identifies 303 (d) streams. The analysis discloses impacts on water quality and water quantity.
Please disclose how the proposed "treatments" would be consistent with Graham, et al., 1994 recommendations for fine and coarse woody debris, a necessary consideration for sustaining long-term soil	1 and 12	The importance of organic matter maintenance through coarse

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productivity.		woody debris recruitment is recognized and provided for by recommendations in the R1 supplement to FSM 2550. Coarse woody debris data ranges from 1 to 17 tons/acre in the proposed harvest activity areas. According to the R1 supplement to FSM 2550, coarse woody debris objectives should follow research guidelines such as those contained in Graham et al. 1994. Leaving 7-25 tons/acre of pieces with a diameter of 3" and greater meets recommendations set forth in Graham et al. for habitat types present in the project area. For practical purposes, a range of 7-12 tons/acre should be left in each unit, Project Design Feature and Mitigation Measures section in chapter 2, p. 43.
Please disclose the results monitoring of weed treatments on the BDNF that have been projected to significantly reduce noxious weed populations over time, or prevent spread. This is an ongoing issue of land productivity.	1 and 12	The Invasive Plant section of the DEIS, p.129. discusses the results of 2000 and 2012 invasive plant inventories; they indicate that infestations are still present but total acres infested has been reduced by 48 percent under the current weed control program. Treatment implementation and effectiveness monitoring of these infestations will occur on an annual basis by district weed control crews and be reported in the Forest Service's Activity Tracking System (FACTS) database consistent with Forest

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		Plan Monitoring Direction.
Harvey et al., 1994 state: The ...descriptions of microbial structures and processes suggest that they are likely to provide highly critical conduits for the input and movement of materials within soil and between the soil and the plant. Nitrogen and carbon have been mentioned and are probably the most important. Although the movement and cycling of many others are mediated by microbes, sulfur phosphorus, and iron compounds are important examples. The relation between forest soil microbes and N is striking. Virtually all N in eastside forest ecosystems is biologically fixed by microbes... Most forests, particularly in the inland West, are likely to be limited at some time during their development by supplies of plant-available N. Thus, to manage forest growth, we must manage the microbes that add most of the N and that make N available for subsequent plant uptake. (Internal citations omitted.) Lacy, 2001 examines the importance of soils for ecosystem functioning and points out the failure of most regulatory mechanisms to adequately address the soils issue. From the Abstract: Soil is a critical component to nearly every ecosystem in the world, sustaining life in a variety of ways—from production of biomass to filtering, buffering and transformation of water and nutrients. While there are dozens of federal environmental laws protecting and addressing a wide range of natural resources and issues of environmental quality, there is a significant gap in the protection of the soil resource. Despite the critical importance of maintaining healthy and sustaining soils, conservation of the soil resource on public lands is generally relegated to a diminished land management priority. Countless activities, including livestock grazing, recreation, road building, logging, and mining, degrade soils on public lands. This article examines the roots of soil law in the United States and the handful of soil-related provisions buried in various public land and natural resource laws, finding that the lack of a public lands soil law leaves the soil resource under protected and exposed to significant harm. To remedy this regulatory gap, this article sketches the framework for a positive public lands soil protection law. This article concludes that because soils are critically important building blocks for nearly every ecosystem on earth, an holistic approach to natural resources protection requires that soils be protected to avoid undermining much of the legal protection afforded to other natural resources. The article goes on: Countless activities, including livestock grazing, recreation, road building, logging, mining, and irrigation degrade soils on public lands. Because there are no laws that directly address and protect soils on the public lands, consideration of soils in land use planning is usually only in the form of vaguely conceived or discretionary guidelines and monitoring requirements. This is a major gap in the effort to provide ecosystem-level protection for natural resources. The rise of an "ecosystem approach" in environmental and natural resources law is one of the most significant aspects of the continuing evolution of this area of law and policy. One writer has observed that there is a fundamental change occurring in the field of environmental protection, from a narrow focus on individual sources of harm to a more holistic focus on entire ecosystems, including the multiple human	1 and 12	Harvey and others (1994) review the effects of management on soil properties, processes, and productivity for eastern Washington and Oregon soils. Topics for "eastside soils" covered include physical and chemical properties, organic matter, microbiology, fire, fertilizer application, and the influence of weather and stand on soil water use in ponderosa pine. Since the paper covers a different geographical area, the specific information presented on eastside soils such as ash-influenced soil properties are not applicable; however, general information/concepts presented, such as that found in the Microbial Ecology section quoted in your comment, are relevant to the Flint Foothills project. We agree that microbial processes are important mediators in nutrient cycling in soils. By following prescribed project design features and mitigation measures (chapter 2) to limit the amount of detrimental soil disturbance associated with project activities and meeting the soil quality standards, these microbial-mediated soil functions would be provided for.

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sources of harm within ecosystems, and the complex social context of laws, political boundaries, and economic institutions in which those sources exist. As federal agencies focus increasingly on addressing environmental protection from an holistic perspective under the current regime of environmental laws, a significant gap remains in the federal statutory scheme: protection of soils as a discrete and important natural resource. Because soils are essential building blocks at the core of nearly every ecosystem on earth, and because soils are critical to the health of so many other natural resources—including, at the broadest level, water, air, and vegetation—they should be protected at a level at least as significant as other natural resources. Federal soil law (such as it is) is woefully inadequate as it currently stands. It is a missing link in the effort to protect the natural world at a meaningful and effective ecosystem level. … This analysis concludes that the lack of a public lands soil law leaves the soil resource under-protected and exposed to significant harm, and emasculates the environmental protections afforded to other natural resources. (Emphasis added.) The problems Lacy (2001) identifies of regulatory mechanisms exist in Regional and Forest-level standards and other guidance applicable for the proposed project.		This comment seems to imply that maximum potential productivity is the goal. Forest soils are periodically limited by N, even under unmanaged conditions. Short-term productivity is often measured over a few years, or even up to a decade and within this time, productivity may decline. Long-term productivity is measured at least at a rotation, and some suggest that the appropriate measure is three rotations. Also refer to response directly above. Lacy (2001) “examines the gap with respect to soil conservation and protection in current federal public land and resources law.” While Lacy provides a discussion on the history of public lands soil law and associated flaws, he does state, “Of all public natural resource laws, the National Forest Management Act (NFMA) provides by far the greatest protection to the soil resource.” Lacy also acknowledges that the Forest Service has developed “somewhat extensive internal standards in its Forest Service Manual (FSM) and Forest Service Handbook (FSH).”

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		National Forest Management Act (NFMA) of 1976 requires that the Forest Service (FS) manage National Forest System lands without substantial and permanent impairment of land productivity and to maintain or improve soil quality. To assure compliance with the NFMA requirement, the FS established Regional Soil Quality Standards. In Region 1 the SQS were most recently revised in 1999. Soil productivity is defined in FSM 2500, Chapter 2550-Soil Management (Forest Service Manual, National Headquarters (WO), Washington DC, 2010) as "the inherent capacity of the soil resource to support appropriate site-specific biological resource management objectives, which includes the growth of specified plants, plant communities, or a sequence of plant communities to support multiple land uses." Because soil productivity is not easily measured (Powers and others 1998; Powers 2002), direct measurement of soil productivity is rarely used, even in research. Rather, surrogates of soil productivity are measured. The Northern Region uses soil disturbance as the surrogate for potential effects to soil productivity and has established

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		thresholds for allowable disturbance. According to Powers (1998) the goal is to define the functional elements of soil that sustain productivity and to identify soil quality indicators of these functions. He further describes the attributes of useful indicators. The indicators that the Northern Region has selected are intended to provide an assessment of potential management effects on the soil functions, which work in combination to produce biomass (productivity). Soil productivity is not a stand-alone soil function. Several soil functions contribute to soil productivity. Although one or more soil functions may be affected by previous or proposed activities, soil productivity may or may not be maintained.
We also recommend at least some minimal amount of field soil monitoring following harvests using the most recent version of the Region 1 Soil Quality Disturbance Monitoring Protocol to verify compliance with the Region 1 soil quality standards of not exceeding 15% cumulative detrimental disturbance.	11	Specific units requiring monitoring to ensure compliance with the R1 SQS can be found in the Soil section of the DEIS, table 68 p. 240.
Climate Change		
Published scientific reports indicate that climate change will be exacerbated by logging due to the loss of carbon storage. Additionally, published scientific reports indicate that climate change will lead to increased wildfire severity (including drier and warmer conditions that may render obsolete the proposed effects of the Project). The former indicates that the Flint Foothills Vegetation Project may have a significant adverse effect on the environment, and the latter undermines the central underlying purpose of the Project. Therefore, the Forest Service must candidly disclose, consider, and fully discuss the published scientific papers discussing climate change in these two contexts. At least the Forest Service should discuss the attached following studies: *(See literature review)* • Depro, Brooks M., Brian C. Murray, Ralph J. Alig, and Alyssa Shanks. 2008. Public land, timber harvests,	4	Discussions of forest carbon cycling and storage (i.e., “carbon flux”) are in the Vegetation section of the DEIS, p. 65. The Forest Service recognizes there is a cause-effect relationship between forests, actions that affect forest carbon

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and climate mitigation: quantifying carbon sequestration potential on U.S. public timberlands. Forest Ecology and Management 255: 1122-1134. • Harmon, Mark E. 2001. Carbon sequestration in forests: addressing the scale question. Journal of Forestry 99:4: 24-29. • Harmon, Mark E, William K. Ferrell, and Jerry F. Franklin. 1990. Effects of carbon storage of conversion of old-growth forest to young forests. Science 247: 4943: 699-702 • Harmon, Mark E, and Barbara Marks. 2002. Effects of silvicultural practices on carbon stores in Douglas-fir – western hemlock forests in the Pacific Northwest, USA: results from a simulation model. Canadian Journal of Forest Research 32: 863-877. • Homann, Peter S., Mark Harmon, Suzanne Remillard, and Erica A.H. Smithwick. 2005. What the soil reveals: potential total ecosystem C stores of the Pacific Northwest region, USA. Forest Ecology and Management 220: 270-283. • McKenzie, Donald, Ze'ev Gedalof, David L. Peterson, and Philip Mote. 2004. Climatic change, wildfire, and conservation. Conservation Biology 18:4: 890 -902.		cycles, and climate change. The primary relationship between forests, forest management, and climate change is the role forests play globally in removing and sequestering atmospheric carbon. Forests naturally cycle carbon. They are in a continual flux, both emitting carbon into the atmosphere and removing it (sequestration) through photosynthesis. The actions proposed under alternatives 2 and 3 may alter the rates and timing of that flux within the individually affected forest stands. These changes would be localized and infinitesimal in relation to the role the world's forests play in ameliorating climate change and indistinguishable from the effects of not taking the action. Meaningful and relevant conclusions on the effects of a relatively minor forest management action such as this on global greenhouse gas pools or global climate change is not possible, nor is it warranted in this case. However, as this is a relatively new public issue and currently of broad interest, the local effects on carbon stores and flux are discussed. Regional, continental, and global factors related to forest's influence on global climate change are also briefly discussed to provide

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		context for understanding the nature of these local effects. Treatments in alternatives 2 and 3 would reduce on-site carbon sources by removing the dead and dying lodgepole component, storing the majority of removed carbon in long-lived forest products such as lumber. Alternative 1 (no action) would leave these carbon sources in place, increasing the potential carbon release through such mechanisms as fire, decomposition, and oxidization of stored carbon into atmospheric carbon (Ryan et al. 2010). By moving decomposing carbon sources from the natural system to the economic system, it may be possible to increase the net carbon storage associated with the given stand. The extent to which there is a net carbon benefit in salvage operations depends on the answers to several questions: Is the turnover rate of carbon transferred to forest products greater than the carbon turnover rate on site? To what extent is site re-growth increased relative to the untreated condition? How much fossil fuel is used in the salvage and product manufacture and distribution operations (Binkley et al. 2007).

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		Forested environments over time are renewable carbon sinks. With the removal of the dead trees as proposed in the action alternatives, overall carbon sequestration would begin to increase more rapidly in the treated stands when compared to the no action alternative by increasing the health and vigor of the trees left on site, increasing the health and vigor of the understory vegetation, and promoting regeneration of seedlings for the next stand. In general, such management actions as those proposed in the project could improve the resilience of forests to climate-induced increases in frequency and intensity of disturbances such as fire and insect and disease epidemics. Utilizing harvested trees for long-lived forest products and renewable energy sources may help sustain the current strength of the carbon sink in U.S. forests (Birdsey et al. 2006 and 2007). Caution is advised against interpreting carbon storage gains from salvage harvest in any specific forest or stand as absolute net carbon gains. This only holds true if harvest does not occur elsewhere in the world to supply the same world demand

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		for timber. The result can be a net carbon impact if the timber is replaced in the marketplace with higher carbon source products such as steel or concrete, or if replacement timber is harvested in a manner that does not promote prompt reforestation (Ryan et al. 2010; Harmon 2009; Murray 2008; Wear and Murray 2004). The Depro et al. paper analyzes the potential effects of three scenarios over 228,000,000 acres of public forests. The Forest Service is proposing to harvest fewer than 2,700 acres, or 0.0013% of that amount. The harvest activities proposed by this project would fall into the business-as-usual (BAU) case as defined by Depro et al. For this scenario, findings suggest that "… public timberlands will continue to sequester carbon through the next century, though at a diminishing rate." Harmon 2001 does not specifically discuss either logging or wildfire severity – it centers on a discussion of scale when determining effects of forestry practices on carbon storage and the carbon uptake, carbon sequestration, and carbon storage in "young" forests versus live "old"

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		forests. In the portion analyzing dead trees, only when the trees die at a steady rate do they, as a collection, store carbon. In the project area, the action alternatives primarily salvage dead trees, most of which died over the course of only a few years and not at a steady rate. At the large spatial scale of this project, there would be more permanent carbon storage in the remaining live and regenerating trees than in the collection of dead trees. The minimal live tree removal would be focused on the smaller diameter trees (storing less carbon) which are likely to be younger than the trees remaining in the project area (storing more carbon). And while the author never defines "young" and "old" forests, there would be no salvage, thinning, or other treatment activities in areas where old growth characteristics would be removed and replaced with a "young' forest. For alternative 2, treatments in old growth stands would not reduce the age, number of large trees, or basal area below the 'minimum criteria' required for Eastern Montana old growth, as described in Standard 1 for Vegetation in the Forest Plan (USDA Forest Service 2009a, pg.

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		44). This project also fits into one of the three scenarios given where carbon sequestration at the landscape scale is not in balance – when the disturbance regime increases in frequency or severity. The mountain pine beetle epidemic has increased the severity of disturbance across the landscape, leading to a decrease in stored carbon and an increase in released carbon. In Harmon et al. 1990, the effects on carbon storage from the conversion of old growth forests to young forests are analyzed. There will be no treatments in areas with defined old growth stands for alternative 3. For alternative 2, treatments in old growth stands would not reduce the age, number of large trees, or basal area below the 'minimum criteria' required for Eastern Montana old growth, as described in Standard 1 for Vegetation in the Forest Plan (USDA Forest Service 2009a, pg. 44). Harmon and Marks 2002 used a model to examine the effects of silvicultural and other treatments on the dynamics of living and dead pools of carbon in Pacific Northwest stands dominated by Douglas-fir and western hemlock. These forest types are vastly

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		different than the lodgepole pine and Douglas-fir types in the project area, so the results from the simulations cannot be transferred or inferred to the treatments in the project area with any kind of accuracy. The Homann et al. 2005 paper used soil survey information and measurements of carbon in old growth forests to predict spatial distribution of potential total ecosystem organic carbon for the Pacific Northwest Region. This project will have no treatments in old growth under alternative 3 and is treating very different forest types than those in the Pacific Northwest. For alternative 2, treatments in old growth stands would not reduce the age, number of large trees, or basal area below the ‘minimum criteria’ required for Eastern Montana old growth, as described in Standard 1 for Vegetation in the Forest Plan (USDA Forest Service 2009a, pg. 44). McKenzie et al. 2004 theorize what may happen to the distribution and abundance of plant species in some ecosystems if climatic change increases the amplitude and duration of extreme fire behavior. These effects may partially depend on the extent to

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		which vegetation structure and fuels are modified. The authors' state in the conclusion that "Anticipating the changing hazards in dynamic ecosystems that are responding to climatic change will be a formidable task for conservation managers, considering the high level of uncertainty about the magnitudes and rates of climatic change, especially for precipitation. In addition, given the complexity of ecosystem function and processes and the stochasticity of ecological disturbance, it is difficult to predict the effects of climatic change on natural resources." The writers of this paper admit that it is difficult to predict the effects of climate change on natural resources; they state they have identified an association of fire and quasi-periodic patterns (El Nino and La Nina) but have little understanding of how these indices will respond to climate warming, and their ability to extrapolate these associations into the future is poor. They also make the case that the use of fire and mechanical thinning for ecosystem restoration is incompatible with late-seral forest and riparian habitat, but fail to identify how much late-seral forest

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		habitats have been added because of fire suppression and management of species that depend on late-seral forest habitats.
We recommend that the Beaverhead-Deerlodge NF consider the climate change considerations discussed above, and include in the DEIS a summary of how the proposed project will address such considerations. For example, including a summary of how warming and drought due to climate change may influencing vegetative conditions. This will help disclose to the public that climate change is a factor influencing vegetative conditions, including bark beetle outbreaks.	11	Through the answer provided above and the Forest Carbon Cycling and Storage discussion in the Vegetation section of the DEIS, p. 65, this analysis does consider climate change considerations. The Vegetation analysis does assess how climatic changes are influencing vegetation conditions through natural disturbances, including insects and fire.
Cultural Resources		
We note a good deal of planning has already occurred for this proposed undertaking but did not see cultural resources as issues or concerns.	9	Heritage resources will be avoided and/or site mitigation will be developed prior to project implementation, DEIS, p. 393.
We would like to see what is being proposed for consideration of cultural resources under 36CFR800 or the R-1 cultural resources PA.	9	In response to the monitoring question: Yes, we are monitoring and sites are being avoided
The proposed Flint Foothills Project located in the Beaverhead-Deerlodge National Forest is within the inherent ancestral lands of the Shoshone and Bannock people, and continues to hold Important cultural properties, traditional hunting, fishing and gathering activities still practiced today by members of The Shoshone-Bannock Tribes. According to the information provided, project activities include constructed skid trails,-temporary roads, and road maintenance which would consist of grading. The project will consist of ground disturbing activities. In the event of an inadvertent discovery (cultural resources and/or human remains) the Tribes request an immediate Stop Work order of construction activitieS and immediate notification to HeTO. Construction shall cease until proper treatment of cultural resources and/or human remains is achieved_ The Tribes also request any current archaeological survey	14	The cultural resources analysis will be completed for the project area using a combination of three standard approaches to cultural resources inventory in a given geographic area. They include Class I, Class II, and Class III inventory strategies. A Class I inventory includes a basic literature review to identify previous archaeological and

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reports for the area of potential effects (APE). The purpose of this letter is to provide technical input and not intended as formal government-to-government consultation. Should there be any Questions or concerns please f eel free to contact me at: (2GB) 478-3707 or email at: csmith@sbtribes.com Carolyn Boyer-Smith Cultural Resources Coordinator The Shoshone-Bannock Tribes		historic research done in the area and to determine what information previous work may have revealed. A wide array of standard references were reviewed, including the NRHP, the Montana State Historic Preservation Plan, General Land Office Plats, Homestead Entry Surveys, Mineral Surveys, land status maps, historic Forest Service maps and professional reports, and historic monographs directly related to the archaeology and history of the Flint foothills area. Class II inventory is a based on the “Site Identification Strategy” (SIS) found in the Region I Programmatic Agreement between the Forest Service and the Montana State Historic Preservation Officer. One hundred percent of high probability areas are intensively surveyed. Thirty percent of moderate probability areas and 10 percent of low probability areas are covered prior to project implementation. A Class III survey (intensive inventory) means that pedestrian transects will be completed across the identified units with an interval of 20 meters between each survey transect. Intensive inventory is designed to identify any surface-visible heritage resources in the survey

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		area. Using a combination of Class I, II and III inventory strategies, the cultural resource surveys including previous cultural resource field inventories, and the 2011 field inventories of the project area were completed. All sites identified from previous cultural resource inventories and the 2011 inventories are noted in the Heritage section, p. 393. All sites will be avoided and/or site specific mitigation measures will be developed in consultation with the Montana State Historic Preservation Office prior to project implementation. Unplanned discoveries of heritage resources during project implementation shall cause project operations in the area of the discovery to cease until analysis and evaluation of the heritage resources are completed, including consultation with the Montana SHPO and appropriate Indian tribes (Forest Plan Standard 2). Heritage protection measures will be added to all appropriate contracts, sales documents, and special use permits (Forest Plan Standard 3).
Timber Harvest/Snag Retention/Pine Beatle Infestation		

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Timber Harvest		
Many adverse consequences to soil, ecological processes, wildlife, and other elements of the natural environment are associated with thinning. (Ercelawn, 1999; Ercelawn, 2000.) For example: “Salvage or thinning operations that remove dead or decayed trees or coarse woody debris on the ground will reduce the availability of forest structures used by fishers and lynx.” (Bull et al., 2001.)	1 and 12	Douglas-fir and subalpine fir stands are identified in the DEIS as habitats currently suitable for fisher. Bull et al. (2001) is referenced in the fisher section of the DEIS.
Please define the amount of habitat loss that has already occurred in the project area due to past logging on public and private lands	3	Effects of past timber harvest on species habitats is addressed in the Wildlife section of the DEIS, p. 144.
Please define the review process that is completed in order to create openings larger than 40 acres. How are public concerns on this issue addressed in the NEPA process?	3	This process follows the direction provided from Forest Service Manual at 2471.1. In summary, the Forest submits to the Regional Forester a request to exceed openings larger than 40 acres prior to the decision for the NEPA analysis, provided the public has been notified and the environmental analysis supports the decision. The public comment period for the DEIS serves as public notification. In the request, reference is made to the relevant chapters in the environmental document (i.e. DEIS) that has evaluated all resources.
Trees killed by fire are worth much more to the forested ecosystem than preemptive timber harvest for goods and services to local communities.	4	Thank you for your comment. The Flint Foothills project does not involve harvesting fire-killed trees. The economic impacts are addressed in the Economic and Social Science section of the DEIS, p. 397.

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The natural resources harmed by commercial harvest are discussed in Opposing Science Attachment #1 *(see literature review)*. This harvest damage is an environmental effect and should be discussed in detail in Chapter 3 of the EA.	4	Literature cited in the Opposing Science Attachments is reviewed the Literature Review section, appendix B.
Designing a Commercial Timber Sale that Removes Mostly Lodgepole Pine is the Antithesis of Ecosystem Management Commercial removal of lodgepole pine is the first item listed in the P&N. Of course there are pockets of red LPP that is dead and dying. This is what's supposed to happen in healthy stands of LPP. Lodgepole pine is a native tree species in many areas of the west. It contains unique habitat for birds and mammals after it burns. Salvaging the dead and dying lodgepole pine not only destroys this post burn habitat but it inflicts damage to other resources as described in Opposing Science Attachment #1. The life cycle of lodgepole pine is dependent on fire. Without fire the serotinous cones of the species will not release their seeds. Without fire the lodgepole pine will cease to exist in the project area. Eradicating a species will rob the project area of its biodiversity. Taking action to simplify the forest is inconsistent with the ecosystem management policy of the Forest Service. Lodgepole will be killed by the beetles (like it should happen) or will die by using a chainsaw. The bug-killed LPP that's allowed to stand will fall to the ground and provide many resource benefits. The LPP that is salvaged will not provide these benefits. The act of salvaging the LPP will inflict damage to the site described in Opposing Science Attachment #1.	4	The mortality to lodgepole pine from mountain pine beetle is more extensive than pockets of dead trees. Additionally, the lifecycle of lodgepole pine does not always follow the path stated in this comment, although it is possible. Not all lodgepole pine that reaches the age of 80–90 years will be attacked by the mountain pine beetle since there are other factors to susceptibility besides age, including size, average phloem thickness, stand mean basal area, stand density index (Jenkins et al. 2007), elevation, and latitude (Amman et al. 1977). It is generally agreed that the mountain pine beetles are visually attracted to large diameter trees (in lodgepole pine, usually 8 inches d.b.h. and above), regardless of phloem thickness (Amman and Logan 1998). In addition, not all trees that are infested will die – sometimes there are unsuccessful attacks (pitchouts) and occasionally a portion of a tree is successfully infested and brood is produced without killing the tree (strip attack) (McGregor and Cole 1985).

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		While many lodgepole pine trees have serotinous cones that do need the heat of a fire for seed release and dispersal, lodgepole pine stands also regenerate after a mountain pine beetle epidemic without the need for a fire (Kaufmann et al. 2008). Serotiny is highly variable within the tree, among trees within stands, and among stands, varying from 0–85%, probably averaging less than 50% in the Northern Rocky Mountains of the United States (Lotan and Perry 1983). The serotinous cones on branches that have fallen near the ground are exposed to warmer temperatures than those found in the canopy and heat adequately through solar radiation to release seeds (Kaufmann et al. 2008, Hellum and Pelchat 1978, Kotok 1971). Seeds previously released from non-serotinous cones may exist in the existing seed bank in the forest litter, may continue to fall from the remaining live trees within the stands, and/or may blow in from live trees nearby (Kaufmann et al. 2008) as they are small and among the most dispersible of North American conifer seeds (Critchfield 1978). Therefore, as shown by the discussion above, the

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		commenter's summary that lodgepole pine would be eradicated from the project area through the proposed actions would not occur. In fact, the expectation that the harvest units will experience natural lodgepole pine regeneration within five years is well-supported by scientific literature, FACTS database queries, and many years of experience with this type of activity on the BDNF. FACTS database queries show that 94 percent of harvested stands reach the fully stocked certification standard of 200 trees per acre within the required 5-year period Approximately 1,100 acres (varies slightly by alternative) of approximately 18,000 acres (6% of the lodgepole pine acres) are proposed for salvage with clearcut treatments. This leaves about 17,000 acres or 94% of the lodgepole in the project area to continue to undergo natural processes without management. The purpose and need, DEIS, p.x. does not include attempting to prevent future mountain pine beetle infestations or to reduce chances of fire through salvage with clearcut. The citations provided by the commenter are addressed in the Literature Review section,

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		appendix B.
Never must beneficial processes in the forest be eliminated in order to enrich private entities financially! One of the needs stated in the P&N for lodgepole removal states: "salvage infested lodgepole pine to capture their product value before they deteriorate" This is inconsistent with the policy statements made public by Forest Service Associate Chief Sally Collins. "our focus today in the Forest Service is no longer on logging and road-building. In the last 5 years, for example, we decommissioned 14 miles of road for every mile of road added to our forest road system. And where we do cut timber, it is usually a byproduct of forest health projects-like cutting 14-inch white fir to protect giant sequoia groves." From a speech by Forest Service Associate Chief Sally Collins "Changing Public Land Uses: A Tale of Two Debates" Outdoor Writers Association of America, 76th Annual Conference Columbia, MO-June 17, 2003 http://www.fs.fed.us/news/2003/speeches/06/collins.shtml "Post-World War II, we entered a new period characterized by timber production. From the 1960s to the 1980s, every administration, with strong congressional support, called for more timber harvest from the national forests, with the goal of replacing the depleted stocks of private and state timber as a result of the war effort. We measured success largely in terms of producing timber and providing multiple uses, including outdoor recreation and fish and wildlife. In the early 1990s, that changed again. Today, we're in a new period focused primarily on ecological restoration and recreation. Maybe more than ever before, we are focusing on delivering values and services like clean air and water, scenic beauty, habitat for wildlife, and opportunities for outdoor recreation. Not only do Americans want these things from their national forests, but this shift is also essential to cope with some huge threats to the sustainability of these forests." (pp 8-9) Forest Service Associate Chief Sally Collins "The Future of Partnering with the Forest Service " A speech presented at the Annual Meeting of the National Association of Conservation Districts Atlanta, GA—February 8, 2005 http://www.fs.fed.us/spf/coop/library/NACDspeech.pdf The Perceived Advantages of Reducing Stand Density in order to "Check the Trend of Insect-Related mortality" is not Worth Inflicting Resource Damage to the Thinned Stands. Thinning is commercial timber harvest that uses the same equipment that removes larger trees. Thus, thinning damage is the same as commercial timber harvest resource damage. Trees killed by insect activity make important wildlife habitat. Dead and dying trees that are not hauled to the mill are not wasted trees. Indeed, leaving these trees standing provides habitat. When they fall they provide organic material to enrich the soil. Basing the treatment of conifer trees on the money they might provide to corporations that log or mill the trees is backwards. The trees should be harvested to benefit the many natural resources in the forest. The trees must not be harvested to benefit the corporate bottom-line.	4	The citations provided here are addressed in the Literature Review section, appendix B.
…but it is our feeling that removal of the trees in a timely manner addresses fire danger, economic needs of	5	Thank you for your comment. The

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the forest products industry, and the environmental health of the forest ecosystem. In short it is a win-win proposed action		economic impacts are addressed in the Economic and Social Science section of the DEIS, p. 397. Removal of trees may or may not make a difference in fire danger. Commercial harvest would provide for the economic needs of the forest products industry. The design of the project is intended to contribute to achievement of the following Forest Plan goals and objectives. Goals include managing lands suitable for timber production for the growth and yield of sawtimber, crop trees, pulpwood, and other forest products, including salvage harvest and use forest products to provide economic benefits where project objectives, forest plan objectives, and forest plan standards can be met. Objectives include bringing 10% of lands suitable for timber production into a managed condition and managing those stands already in a managed condition to maintain long term sustained yield.

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Ban all logging to cut a tree because there is a "risk" of infection is stupid. That would be like killing a person 128igante they "might" get sick. How ludicrous can this agency get? If you cut them down, how can they develop a natural 128igantean128 for 128igantean128. They can do that. If you cut them down, no one will ever know. What a stupid plan. I definitely think growing for "long term yield" makes this national site owned by national citizens into a lumberyard for local profiteers. You are changing the whole reason the taxpayers and citizens of this nation worked and slaved to save this site. And you are doing it for greed and money. 128igante is sinking into crap because of this fs focus.	8	Thank you for your comments
Please consider each of the many adverse effects that are directly caused by timber harvest activities. If the Responsible Official plans to accept some of this resource harm then please list the ham in the NEPA document and tell the public why the timber sale is important enough to accept such harm.	10	The environmental effects are described in Chapter 3 of the DEIS.
We also encourage use of timber harvest methods that minimize ground disturbance (e.g., skyline, helicopter, and logging during winter on snow or frozen ground), and inclusion of watershed rehabilitation activities such as road obliteration, road BMP upgrades, road drainage improvements, revegetation, stream and bank stabilization, and other watershed restoration activities as much as possible.	11	All harvest methods are being considered to meet Forest Plan standards for soil disturbance. The most economically efficient harvest methods will be utilized during treatment while maintaining Forest Plan standards. Project design features and mitigation measures are designed to address watershed conditions. Features/measures include road maintenance and reconstruction; BMPs; and road decommissioning, including obliteration, DEIS, p. 43.
Snag Retention and Recruitment		
We are concerned about the lack of any actual snag requirements in the BDFP. Please define exactly how many snags, if any, will be provided for in each harvest unit, or if snags will not actually be provided in these units but instead allotted to adjacent unlogged areas	3	Forest Plan snag standards require retention of snags within treatment units if an area-wide snag analysis has not been completed. No area-wide assessment has been completed for this project.

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Please discuss the current best science, or the Northern Region Snag Management Protocol, and how this science will be applied to the current project.	3	The best available science is applied in the Forest Plan. The Forest Plan provides the direction through Wildlife Standards for the Forest, and supersedes any other direction that was followed in the past within the Region or on the Forest. The application of the FP Standards is displayed in appendix C.
Forest thinning is known to reduce snag recruitment not only by reducing future snags via mortality, but it reduces snags as well by blowdown within thinned stands. It also reduces snags longevity because the larger snags are generally removed for commercial purposes. Please define how these cumulative impacts on snags will affect wildlife.	3	All large snags (> 20.0 inches d.b.h.) would be retained in treatment units (DEIS, p. 156). Commercial thinning treatments would decrease stand densities, thereby accelerating future tree growth. This would also reduce the potential for tree mortality due to insects and disease, wildfire, and growth suppression. While total snag numbers generated in a stand that has been thinned may be less than in a stand that has not been thinned, snags in the thinned stand are more likely to be larger and therefore more functional to a wider range of species (DEIS, p. 156).
We are concerned about the cumulative removal of current and future snag habitat from both past and planned logging, including on private lands. What is the overall loss of snag habitat for these wildlife species and how will this affect landscape viability	3	The DEIS describes the current low amount of snags within past harvest units. The DEIS describes that a large portion of forested stands would remain untreated within the project area. Conditions within these stands currently support snag availability.
Please define the specific effects of forest thinning on snag recruitment over time, including average snag	4	Thinning would likely have an

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size.		immediate reduction in some snags. Snags deemed to be a safety hazard during logging operations would have to be removed. However, with logging being totally mechanized (done by machines), snag hazards are not as common as past harvest methods. Prescribed fire within the units would create new snags that would likely be high quality snags (larger diameter) that would stand for a long period of time. Small snag recruitment due to stand dynamics associated with high stand density would be eliminated for a period of at least 50 years. Retaining existing snags to the extent possible would be part of the timber sale contracts, which would retain the current snag habitat. Providing large, fresh snags through the prescribed burning activities would provide potential future habitat (Harrod et al. 2009). The effects to snags by thinning would be over the acres proposed to be commercially thinned (alternative 2, 1149 acres; alternative 3, 666 acres); the remaining approximately 13,000 acres (out of 14,247 acres total, or 91%) of mid- to late seral Douglas-fir – ponderosa pine forests would not be affected.
What is the current availability of larger snags on the BDNF, and how will this project affect that availability?	4	Bush et al. (2006) estimated that the density of snags 10-19.9

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		inches d.b.h. was 6.7 per acre. The average density for snags 20.0 inches or greater d.b.h. was 0.4 per acre at the Forest level. Since then, these densities have likely increased due to insect-related tree mortality. The project would retain the large snag component by retaining snags larger than 15.0 inches d.b.h. per Forest Plan direction.
Please define what the expected reduction of snag habitat, including snag sizes, will be during project implementation	13	The effects to snags as a result of proposed treatments are described in the DEIS, p. 156.
Please define how snag recruitment will be achieved in clearcuts, and how snag recruitment will be affected by commercial thinning.	13	Snag recruitment in the salvage with clearcut units would be negligible. The lodgepole pine stands proposed for salvage are currently comprised of existing snags (recently dead lodgepole pine) or soon to be snags (dying lodgepole pine). About 1,100 acres (varies slightly by alternative) of approximately 8,500 acres of mid- to late seral lodgepole pine (13% of the mature lodgepole pine acres) are proposed for salvage with clearcut treatments. This leaves about 7,400 acres or 87% of the lodgepole in the project area to continue to provide snags.
How will this project affect the total lack of large snags over 20 inches dbh in the Flint Uplands landscape?	13	The project would retain the large snag component by retaining snags larger than 15.0 inches d.b.h. per Forest Plan direction.

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The Forest Plan implies that snag habitat will be monitored within project areas. Has this been done for this project, and how was it completed? How will the snag numbers after logging be measured?	13	The Forest Plan monitoring strategy shows that condition and trend of key characteristics of vegetation diversity, including snag numbers, would be monitored based on FIA national inventory and/or other local Forestwide or project level inventories. Inventory reporting is scheduled to occur every 5 years (Forest Plan, pg. 275). Within the Flint Foothills project area, existing snag numbers were assessed as part of stand exams conducted within proposed treatment units (DEIS, p. 156). Compliance with snag retention requirements would be monitored during harvest implementation.
Please define how snag management, including past logging losses of snags, was considered in the design of this project. Since all the past logging cannot mitigate the removal of snags, how is tins problem being addressed in the proposal	13	The DEIS describes the current low amount of snags within past harvest units. The DEIS describes that a large portion of forested stands would remain untreated within the project area. Conditions within these stands currently support snag availability. Forest Plan snag retention requirements would apply to proposed treatment units.
Pine Beetle Infestation		
Please define the published science that identifies an increase in fire risk as a result of pine beetle infestations.	3	There isn't a published scientific document that has the simple correlation of an increase in fire

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		risk as a result of pine beetle infestations. Jenkins et al (2007) is a recent specific assessment of these relationships, and concludes that bark beetles and their effects on fuel accumulations and subsequent fire hazard are poorly understood. Although bark beetles have a significant effect on fuels, weather conditions play an important role in the intensity and duration of fires (Jenkins et al 2007).
The scoping notice only defined the detrimental impacts of beetle infestations on timber production. However, the beneficial effects to many wildlife species were not noted. Please provide a balanced review of beetle infestation impacts on ecosystems.	3	Contributions of insect-related tree mortality to wildlife habitats are described in Wildlife section of the DEIS, p. 147 as summarized by Chan-McLeod (2006).
The act of salvaging the LPP will inflict damage to the site described in Opposing Science Attachment #1. If the insect activity is not within 1 mile of a WUI it should be left alone with 35,000 pound pieces of industrial machinery. Please allow this species to complete its life cycle. After the trees are dead the Mountain Pine Beetles have moved on. Salvage logging has no effect on the beetle population. See Opposing Science Attachment #17.	4	The purpose and need for this project, DEIS, p.x, and the subsequent proposal designs, are not designed to have an effect on the mountain pine beetle population. Literature cited in the Opposing Science Attachments is reviewed the Literature Review in appendix B
Insect activity is an indicator of a healthy forest. Please see *A Healthy Forest Needs Bugs (link in literature review; also see Opposing Science Attachment #5)*	4	Literature cited in the Opposing Science Attachments is reviewed the Literature Review section, appendix B.
Insect Activity is an Indicator of a Healthy Forest. This includes mountain pine beetle. Native insects have existed in our forests for thousands of years. Forests that have had insect activity are still healthy. Forests that have been manipulated to make money from this natural process are unhealthy.	4	The Vegetation analysis acknowledges the function of mountain pine beetle in the natural disturbance processes within the project area DEIS p. 67.

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		The analysis does not state the current health status of the forest (either the managed or unmanaged portions) within the project area (as either healthy or unhealthy). The Vegetation analysis does quantify the number of acres of pine affected trees from mountain pine beetle, DEIS, p. 68.).
Active timber management will maintain a diverse and dynamic forest providing quality habitat for wildlife species including native fish, and removal of trees that have succumbed to insect and disease infestations will provide a favorable environment for reestablishment of a healthy forest ecosystem on these sites. Allowing catastrophic levels of dead and dying trees to remain for an extended period does not promote healthy forests, does not embrace the principles of active resource management, and is counterproductive to meet ecologic, economic and cultural needs.	5	The purpose and need, DEIS p. 4, does not include managing for healthy forests, or managing for quality habitat for wildlife or fish habitat. The purpose and need does manage stand conditions, captures economic value of the wood product, creates early seral conditions, and reduces forest densities.
It is good to see a plan that will utilize some of the beetle killed trees.	7	Thank you for your comment.
Utilizing the dead trees will also be helpful to us in the long term since climbing through tangled deadfall after elk is not high on our list of things we like to do.	7	Thank you for your comment. Removal of dead trees is a key component of action alternatives and is a positive attribute to scenery as well as big game access. Downed wood from timber harvesting and tree thinning has a negative impact on scenic beauty. Removing dead wood or chipping onsite can greatly increase scenic ratings for tree thinning projects (Ryan, 2005).
There was also no analysis in the Forest Plan regarding the need to reduce insects. This strategy will eliminate habitat for many species. Objectives that do not look at potential impacts are arbitrary.	13	The project does not propose to reduce insects – that is outside of the stated purpose and need,

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		DEIS. p. x. Salvaging dead and dying trees would not reduce habitat for insects, as the trees impacted by mountain pine beetle have already served as hosts for the insects. About 1,100 acres (varies slightly by alternative) of approximately 8,500 acres of mid- to late seral lodgepole pine (13% of the mature lodgepole pine acres) are proposed for salvage with clearcut treatments. This leaves about 7,400 acres or 87% of the lodgepole in the project area to continue to provide insect habitat. There would also be a reduction of insect habitat through commercial thinning and seed tree harvest in lower elevation Douglas-fir and ponderosa pine habitat would reduce habitat for insects. Habitat for insects would be reduced over the acres proposed to be seed tree and thin harvest (alternative 2, 1502 acres; alternative 3, 1019 acres); the remaining approximately 13,000 acres (out of 17,000 acres total, or 75%) of mid- to late seral (pole through sawtimber) Douglas-fir – ponderosa pine forests would not be affected and available for insects.
Temporary Roads/Road Construction/Decommissioning/Restoration		
Temporary Roads		

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Please define the long-term management plans for all the new temporary roads that will be built for this project. What will the total road density be before and after project completion? If the temporary roads will not be completely obliterated, this should be noted.	3	Road densities are disclosed in the transportation specialist report. They are as follows. Alt 1: before = 2.94 miles per square mile, during = 2.94, after = 2.94. Alt 2: before = 2.94, during = 3.06, after = 2.89. Alt 3: before = 2.94, during = 2.94, after = 2.90. All new temporary roads would be decommissioned by obliteration, following completion of the vegetation treatments that these roads access. Existing roads used as temporary roads for the vegetation treatments would also be decommissioned, although by a variety of rehabilitation methods. See table 6 in the description of the action alternatives for more information on specific decommissioning of existing open and closed unauthorized roads.
Please consider the following information: Sometimes temporary roads create more sediment per mile than system roads. This is because: 1) The earth must be handled twice when constructing and obliterating temp roads. 2) Temp roads are “designed” by a logger on a cat with no knowledge of hydrology and the logger is under pressure to work quickly. 3) Most temp roads are outsloped, thus, the water on the road drains off the road at random places. 4) Temp roads have no surfacing to slow the water velocity. High water velocity picks up more sediment particles. 5) Temp roads have no ditch. Ditches adjacent to system roads control the water until the road designer calls for an appropriate outlet culvert location. 6) Sediment-laden water leaves the temp road at random locations . . . often in the streams. Please read “Temporary Roads are Like Low Fat Ice Cream” by George Wuerthner, 3-17-09. *(see literature review)*	4	Project design features for temporary road construction to avoid drainage problems that can lead to increased sedimentation have been developed, DEIS, p. 43. Alternative 3 was developed to exclude new road construction. The selected alternative would utilize contract requirements for mitigation of resource damage related to temporary road construction and use, including addressing drainage concerns. The alternative descriptions,

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		DEIS, p. 13, in the Transportation section and the Transportation report in the project file included additional descriptions of road work.
Road Construction Damages the Proper Functioning of Several Natural Resources in the Forest … Primarily the Aquatic Resources The Foothills Vegetation Management project proposes to construct 7 miles of temporary road. For over a decade the agency has been telling the public that temporary road construction is benign. Some proposed timber sales actually exclude temporary road statistics in the road construction section of the ROD or DN.	4	Road management is extremely important for reducing the environmental effects of roads. Project design features for this project have been designed to prevent sedimentation from roads as a result of the project, DEIS, p. 43. The sedimentation from roads is disclosed in the Hydrology section of the DEIS, p. 263.
I like the fact that any new roads will be taken out when finished	7	Thank you for your comment.
For decades the forest service has stressed to the public that temporary roads are ecosystem benign because they will be obliterated after use. Of course this is untrue.	10	Please see response to Letters 1 and 4
Please discuss how many old logging roads will be used for the project, and why the 10 miles of additional temporary road that will be required for this project will not be used again in the future as well, for more logging. Aren't all these logging roads actually permanent roads that are used intermittently? Their impact needs to be fully assessed.	13	The description of road categories and proposed uses is provided in the description of the alternatives, DEIS, p. 13, To summarize, a combination of new and existing roads are proposed to implement vegetation treatments. Alternative 3 has been created that does not include any new roads, only proposing to utilize existing routes. Both alternatives include use of existing unauthorized routes for vegetation treatment access. Both of these alternatives would

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		include decisions regarding the future management of these roads. In both alternatives, some would become permanent roads and managed under the Forest transportation system, while others would be temporarily used and decommissioned.
Road Construction/Decommissioning/Restoration		
Ban new roads	8	Thank you for your comment. The no action alternative and alternative 3 do not construct new roads.
The scoping package indicates that 10 miles of road will be constructed as part of the Proposed Action. Scientists know that road construction in the forest destroys the proper functioning of the natural resources.	10	Thank you for your comment. The environmental consequences in Chapter 3 of the DEIS address the effects of road construction on the resources For the action alternatives, impacts from roads are addressed in the applicable resource sections in Chapter 3 of the DEIS. Also, please see responses above to letters 1, 4, and 13
Please do not construct any roads (temp or system) for this sale. Of course there will be trees that cannot be harvested. This isn't as tragic as allowing harm to occur to the natural resources on public land.	10	Alternative 3 was developed exclude new system or temporary roads construction, DEIS, p. 32.
If this plea makes no effect on the Responsible Official and the roads for this project will still be constructed, then please include a section in the draft NEPA document listing the resource damage roads inflict on the forest by the roads.	10	Impacts from roads are addressed in the applicable resource sections in Chapter 3 of the DEIS.
We are losing about 200 square miles of our public land to development each week. There are over 400,000 miles of road in our national forests. That's enough to reach the moon and half way back.	10	Thank you for your comment.

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Reductions in sediment transport to streams from roads often provides a good means of offsetting sediment production and transport associated with timber harvest and road construction activities. Roads are often major anthropogenic source of sediment that affect hydrology, water quality and fisheries in streams on public lands (e.g., road planning and design to minimize new roads; locate roads to minimize water quality and fisheries impacts; and improve the condition of roads with BMPs, realignment, and storage and decommissioning of roads).	11	Under the action alternatives, the proposed road maintenance activities would be accomplished in compliance with best management practices (BMPs) and other project design features, DEIS, p. 43.
We recommend minimization of new road construction to reduce adverse environmental effects, and locating roads to minimize effects to surface waters.	11	Under alternative 2, new road construction is proposed only in locations where the interdisciplinary team agreed on alignment. The applicable resource impacts have been analyzed and disclosed in the resource reports in the DEIS, Chapter 3.
The NOI states that the proposed action may include construction of approximately 10 miles of temporary roads and use of 72 miles of existing roads. We encourage minimization of new road construction as much as possible, particularly permanent new roads, and location of roads away from streams and riparian areas.		Alternative 3 was developed to exclude new road construction, DEIS, p. 32.
In anticipation of the road sediment reductions that will be called for in the upcoming TMDLs, the proposed project should seek to decrease sediment loads from forest roads. Please ensure that the Environmental Impact Statement (EIS) for the proposed project will assess road sediment load reductions associated with the proposed Best Management Practices (BMPs). The inclusion of road BMPs and decommissioning is very important and the WPS encourages this effort.	15	Under the action alternatives, the proposed road maintenance activities would be accomplished in compliance with best management practices (BMPs) and other project design features, DEIS, p. 43
We suggest that the Forest describe the current conditions of the road system, including an assessment of project area roads that do not meet forest road maintenance standards. We suggest that road restoration measures be included to address project area roads with significant water quality concerns, rather than limiting the project road restoration measures to only timber haul roads. Unless systematic project-area road restoration is implemented and road BMPs are maintained, sediment reduction benefits from haul road	15	Detailed information from road condition surveys on each project-related road is documented in the "road logs" in the Transportation section in the project file. The

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restoration activities may be temporary, and may not provide improved water quality over the long term, especially for roads near streams and with stream crossings.		Transportation section in the DEIS, p. 105 has information on the type of road improvement and maintenance activities proposed. Appendix B of the Transportation Report in the project file has estimated route-specific work items based on the road condition surveys. The purpose and need, DEIS p.4. does not include project-area-wide road restoration. However, road maintenance and improvements are proposed where access to vegetation treatments are needed. The roads proposed for use would have maintenance performed in accordance with BMPs, in addition to other project design features, DEIS, p.43. While these improvements are only associated with the specific roads included in the project, the watershed benefits are still worthwhile.

Opposing Science Literature Review

The following table displays the Forest Service response to opposing science received during scoping.

Table B- 3. Literature suggested during scoping and the Forest Service responses

Letter Number	Literature
4	**Agee, J.K. 1994. “Fire and weather disturbances in terrestrial ecosystems of the eastern Cascades.” USDA Forest Service. Gen. Tech. Rep. PNW-GTR-320. 52pp.** “Twentieth century forest management, for all its good intentions, has left a mess on the landscape.” http://www.andykerr.net/GenForests/ForestFiretQuotes.html **Review: Relevant to the Project** *Although the quote above does not occur within the document, nor does the document imply that twentieth century forest management left a mess on the landscape. Rather, the document provides indepth analysis on disturbance processes in the eastern Cascades in the states of Oregon and Washington, with the primary focus being fire. The document does speak to the interruption of natural fire regime disturbances and their function in the varying vegetation communities with management practices in the twentieth century. In the assessment provided by the document, the findings are similar and supportive of what the Flint Foothill vegetation analysis provides, namely that the lack of natural fire has allowed a progression of higher densities and fewer early seral species, with the increase in insect mortality, and the best path to better management is to consider “ecological relations by climax series and plant association groups” in “understanding major processes and effects, and how each of them varies” (Agee 1994). “Ultimately, insect, disease, and fire hazards should be understood by climax series and these same or similar plant association groups” (Agee 1994).*
4	**Aguirre-Bravo, Celedonio and Carlos Rodriguez Franco, compilers 1999. “North American Science Symposium: Toward a Unified Framework for Inventorying and Monitoring Forest Ecosystem Resources.” Guadalajara, Mexico (November 2-6, 1998). Proceedings RMRS-P-12. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station** “The general objective of this Symposium was to build on the best science and technology available to assure that the data and information produced in future inventory and monitoring programs are comparable, quality assured, available, and adequate for their intended purposes, thereby providing a reliable framework for characterization, assessment, and management of forest ecosystems in North America.” http://www.fs.fed.us/rm/pubs/rmrs_p012.html **Review: Not Relevant to the Project** *This symposium was a compilation of inventory and assessment approaches (views) from the three North America countries (Canada, United States and Mexico), with the recommendation that the three countries prepare continental wide forest assessments on concerns of common*

Letter Number	Literature
	interest.
4	**Al-jabber, Jabber M. 2003 "Habitat Fragmentation: Effects and Implications."** "Fragmentation has been considered as one of the most major factors that lead to the decline of many wildlife species (Brittingham and Temple 1983, Yahner 1988, Winslow et al. 2000) because fragmentation tends to decrease population productivity (Robinson et al. 1995). Therefore, Meffe states that "fragmentation has become a major subject of research and debate in conservation biology" (Meffe et al. 1997, p. 272). Forest fragmentation usually occurs when large and continuous forests are divided into smaller patches as a result of road establishment, clearing for agriculture, and human development (Robinson et al. 1995, Meffe et al. 1997)." (Pg. 1) "Generally, habitat fragmentation is an ecological process in which a large patch of habitat is divided into smaller patches of habitats. Usually, this process is caused by human activities (roads, agriculture, and logging). It also reduces the value of the landscape as habitat for many species (plants and animals). Fragmentation alters natural habitat in many ways, including reduction of patches' sizes, increment of distances between similar patches, and increment of edges and predation (Brittingham and Temple 1983, Robinson et al. 1995)." (Pp. 2 and 3) **Review: Relevant to the Project** *This unpublished, non-peer reviewed paper summarizes the general effects of habitat fragmentation. General concepts from this paper, including the effects of large openings, have been incorporated into the wildlife section of the DEIS, and in species-specific analyses where appropriate. Traditionally, fragmentation has referred to forest where there has been a permanent forest loss due to agricultural conversion, urban expansion or other permanent development. In this case, we are referring to fragmentation in managed forest landscapes where stands of mature trees are interspersed with dead and dying stands, and younger-aged stands. As noted in Samson (2006), Gallant et al. in the Greater Yellowstone Ecosystem found "the primary forest dynamic in the study area is not the fragmentation of conifer forest by logging, but the transition from a fire-driven mosaic of grassland, shrubland, aspen and mixed forest to a conifer-dominated landscape (Forest Plan FEIS, pg. 899). The Forest Plan vegetation goals, objectives and standards were developed based on historic vegetation patterns and size class structure. The assumption was made that maintaining historic patterns and size class structure will maintain habitats for wildlife species that evolved and are adapted to local habitat conditions (Forest Plan FEIS, pg. 473).*
4	**Amaranthus, Mike P. Ph.D., Raymond M. Rice Ph.D., N. R. Barr and R. R. Ziemer Ph.D. "Logging and forest roads related to increased debris slides in southwestern Oregon." Journal of Forestry Vol. 83, No. 4. 1985.** "Debris slides over a 20-year period were inventoried on 137,500 acres of forested land in the Klamath Mountains of southwest Oregon. Frequency during the study period was about one slide every 4.3 years on each 1,000 acres-an erosion rate of about 1/2 yd3 per acre per year. Erosion rates on roads and landings were 100 times those on undisturbed areas, while erosion on harvested areas was seven times that of undisturbed areas. Three-quarters of the slides were found on slopes steeper than 70 percent and half were on the lower third of slopes." "Soil erosion rates due to debris slides were many times higher on forests with roads, landings, and logging activity than on undisturbed forests." http://www.fs.fed.us/psw/publications/ziemer/Ziemer85.pdf

Letter Number	Literature
	Review: Relevant to the Project *This paper reviews landslide frequency as affected by forest management in the coastal mountains of Southwest Oregon. The authors found a six-fold increase in landslide volume in Forest Service-logged areas compared with unharvested areas, as well as erosion rates that were 100 times greater on roads and landings compared with undeveloped areas. The study area geomorphology and climate are completely different from that of the Flint Foothills project area. Most important to note, however, is the fact that no landslides have been found within the project area. The DEIS acknowledges the effects of roads on erosion (sedimentation). These effects are disclosed in the DEIS in the Hydrology section. Additionally, mitigation measures to address erosion from roads is prescribed and discussed in the DEIS.*
1	**Ament, Robert. 1997. "Fire Policy for the Northern Rocky Mountains (U.S.A.)." Publisher not available with article.** "Continued mismanagement of national forest lands and FS refusal to fully implement the Fire Policy puts wildland firefighters at risk if and when they are dispatched to wildfires. This is a programmatic issue, one that the current Forest Plan does not adequately consider. Please see Ament (1997) as comments on this proposal, in terms of fire policy and Forest Planning.*"* www.landsinfo.org/ecosystem_defense/Science_Documents/Ament_1997.doc **Review: Not Relevant to the Project** This is an opinion piece and not a peer reviewed scientific paper on the failure of fire suppression and prevention policies and the need to have a strategic fire suppression approach in the Northern Rockies. The author claims that the current prescribed fire policy is ineffective for reducing wildlfires and that the prescribed natural fire policy is underutilized. It concludes with recommendations for future actions with respect to fire suppression and preventions actions. The Flint Foothills project does not include an objective to reduce fuels. Rather, prescribed burning is proposed to create a mosaic of age classes and reduce stand density to meet Forest Plan objectives.
4	**Atcheson, David. "Clearcuts and Corporate Welfare: Sweetheart land deals and bailouts hide the true cost of corporate logging." Washington Free Press, July/August, 1996.** "In June of 1995, Essential Information, together with the CATO Institute and the Progressive Policy Institute, released a Dirty Dozen list of federal subsidies to cut from future budgets. The groups recommended the elimination of the Forest Service road construction budget to curb sales of timber from public lands to private companies. Cutting the road budget would save roughly $600 million over five years." http://wafreepress.org/22/Timber.html **Review: Not Relevant to the Project** *This opinion paper provides some background on an outdated financial accounting system that is not pertinent to the Flint Foothills economic analysis. Costs and revenues resulting from the various alternatives for Flint Foothills have been considered and displayed in the Economics section of the DEIS.*
4	**Babbitt, Bruce (DOI Secretary) and Dan Glickman (USDA Secretary) "A Report to the President in Response to the Wildfires of 2000"**

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	September 8, 2000 "Notably, the Administration's wildland fire policy does not rely on commercial logging or new road building to reduce fire risks and can be implemented under its current forest and land management policies. The removal of large, merchantable trees from forests does not reduce fire risk and may, in fact, increase such risk. Fire ecologists note that large trees are "insurance for the future – they are critical to ecosystem resilience."10 Targeting smaller trees and leaving both large trees and snags standing addresses the core of the fuels problem.11 The Congressional Research Service (CRS) recently addressed the effect of logging on wildfires in an August 2000 report and found that the current wave of forest fires is not related to a decline in timber harvest on Federal lands. From a quantitative perspective, the CRS study indicates a very weak relationship between acres logged and the extent and severity of forest fires. To the contrary, in the most recent period (1980 through 1999) the data indicate that fewer acres burned in areas where logging activity was limited." http://www.forestsandrangelands.gov/resources/reports/documents/2001/8-20-en.pdf#xml=http://na.fs.fed.us/cgi-bin/texis.exe/Webinator/search/xml.txt?query=babbitt%2C+glickman&pr=HFR&prox=page&rorder=500&rprox=500&rdfreq=500&rwfreq=500&rlead=500&sufs=0&order=r&cq=&id=4c60c0b7e0 **Review: Not Relevant to the Project** *The citation is a congressional report that summarizes a Congressional Research Service study of the effects of logging on wildfire risk. The Flint Foothills Project purpose and need does not include a reduction in wildfire risk.*
4	**Barnard, E. L. Ph.D. "Forest Health Fundamentals" from Forest Management, 4004.** "Defining forest health has proven to be something akin to shooting at a moving target. Different groups and different folks often mean different things when they use the term. Attempts to formulate a standard "one size fits all" definition have occupied untold hours of bureaucratic, professional and academic meetings, and consensus remains elusive. Why? To begin with, when we talk about forest health, it is necessary to identify the scale of our focus. Are we talking about a pine plantation, a particular forest ownership, a county, a state, a region, etc.? Such scale is not always defined, and is often prioritized differently by different people for varying reasons. Another reason seems to be that one's concept of "healthy" is often inextricably linked to what he or she desires from the forest. What may be undesirable to forest managers emphasizing timber production may well be desirable to others interested primarily in wildlife habitat or biodiversity, and vice versa." http://www.fl-dof.com/forest_management/fh_fundamentals.html **Review: Not Relevant to the Project** *The main question posed by this reference is whether or not Florida's forests are healthy. The whole discussion on forest health by this reference occurs in a completely different forest type and does not address the forest conditions in the Flint Foothills project area. In addition, there is no reference to forest health in the Flint Foothill project analysis because the project is not addressing forest health, but rather responding to conditions created by the mountain pine beetle epidemic.*
4	**Barry, Glen, Ph.D. "Commercial Logging Caused Wildfires" Published by the *Portland Independent Media Center*, August 2002.**

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	“The biggest ecological con job in years is being waged by the U.S. Republican party and their timber industry cronies. They are blaming the recent Western wildfires on environmentalists, and assuring the public that commercial logging will reduce the risk of catastrophic wildfires.” http://portland.indymedia.org/en/2002/08/17464.shtml **Review: Not Relevant to the Project** *The citation is an opinion piece on the effects of logging on wildfire risk. The Flint Foothills project purpose and need does not include a reduction in wildfire risk.*
4	**Barry, Glen Ph.D. “Insect Attacks May Benefit Colorado Forests” Forests.org, January 29, 2004.** “Forests change. Disturbance including insects and fires are frequently part of the regenerative process. Rarely is it possible or desirable to maintain a forest at some seemingly idyllic stage of succession. Forest health – including services provided such as water – require managing to maintain natural processes. In the overgrown western U.S., fires and insects are resetting the system in response to years of fire suppression and changing climate. They are doing so in a way that will lead to adaptive and renewed forests, with far improved outcomes than logging could ever hope to achieve. Bush’s “Forest Health” initiative will only exacerbate the negative situation. These forests are still extensive and large enough that letting them be is the best forest health prescription.” http://forests.org/blog/2004/01/insect-attacks-may-benefit-col.asp **Review: Not Relevant to the Project** *This is a blog responding to an article published by the Associated Press on the unprecedented insect outbreak in Colorado that was outlined in the state’s annual forest report. The Flint Foothills project and greater area in Montana are experiencing similar insect infestations, though the insect and tree species differ from that in Colorado’s annual report. The opinion expressed by the blogger appears to be targeting the Health Forest Initiative/Healthy Forest Restoration Act, which are focused on fuels reduction. The purpose and need for the Flint Foothills project is does not include an objective to reduce fuels.*
4	**Barry, John Byrne. “Stop the Logging, Start the Restoration” from *The Planet newsletter* June 1999, Volume 6, Number 5** “According to a 1998 poll by a firm that has worked for several Republican House members and two presidents, 69 percent of Americans oppose commercial logging on federally owned land. The Forests Service’s own poll showed that 59 percent of Americans who expressed an opinion oppose timber sales and other commodity production in national forests.” “Many Americans are surprised to learn that logging is even allowed on public lands. Alas, it has been since the Organic Act of 1897 first authorized logging in America’s new forest reserves. That legislation called for watershed protection and a steady supply of timber – what the Forest Service calls ‘multiple use.’ “ “But the agency has been unable to balance those goals. More often than not, the integrity of the forest ecosystem has been sacrificed to maximize timber and other commodities. And at taxpayer expense, notes Bernie Zaleha, chair of the End Commercial Logging on Federal Lands (ECL) campaign. The Forest Service lost $2 billion on its logging program from 1992 to 1997, according to the General Accounting Office. It spends more

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	on building roads and preparing sales than it gets back in timber receipts." http://www.sierraclub.org/planet/199905/ecl1.asp **Review: Relevant to the Project** *This is an article that alludes to a national survey, though not specific to the Flint Foothills Project. Local and national surveys from the past 30 years are presented in the Economics section of the DEIS to show a range of public sentiment on forest management.*
4	**Bartuska, Dr. Ann. Deputy Chief for Research and Development, USDA Forest Service, before the House Resources Forest and Forest Health Subcommittee July 15, 2004. (Excerpt from testimony)** "Forest Service managers strive to use the best science available in their decision making." http://www.fs.fed.us/congress/108/house/oversight/bartuska/071504.html **Review: Not Relevant to the Project** *The testimony is given in the context of restoring forests after catastrophic events, specifically wildfires, not directly referencing the Flint Foothills Vegetation Management Project. The mountain pine beetle infestation affecting the Flint Foothills area has not been deemed a "catastrophic event" though it is the largest and most severe in recorded history. It does not involve emergency stabilization and rehabilitation treatments following a fire. The testimony is not directly relevant to the project. With respect to "the best science available" the project considers the latest and best science available; more than 100 references are cited in the analyses.*
4	**Beschta, Robert L. Ph.D. et al. 1995 "Wildfire and Salvage Logging: Recommendations for Ecologically Sound Post-Fire Salvage Management and other Post-Fire Treatments on Federal Lands in the West"** "In view of the extent and persistence of human disturbance throughout forest and watershed ecosystems, continuing to simply manage fire risk without controlling the adverse effects of logging, grazing, road building, and mining is unsound resource management; it is an approach that without careful thought could lead to further damage rather than to the intended goal of protecting forest and stream health, as such an approach addresses the symptoms rather than the causes." "We need to accept that in many areas throughout the region, past forest management may have set the stage for fires larger and more intense than have occurred in at least the last few hundred years." http://www.saveamericasforests.org/congress/Fire/Beschta-report.htm **Review: Not Relevant to the Project** *This project is not in a recently burned area nor is it a fire salvage sale. This commentary was written by a group of scientists intending to help guide the policy debate concerning salvage logging in post-wildfire watersheds. The authors present several scientific principles and practices that are directed at promoting ecological recovery from wildfire events. The paper describes several areas and situations where the authors believe that*

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	salvage logging disrupts ecologic recovery in burned watersheds. *Beschta et al. provide findings and recommendations for fire management and salvage logging. In general, they find that natural recovery is a better path to ecologic recovery than management intervention. They reason that species in fire adapted ecosystems have the ability to recover from wildfires, and that historic and continued human intervention only retards the ecological recovery process. The authors list several recommendations on post-fire actions.* *This paper is not focused on specific ecological, social or economic characteristics of the Flint Foothills project area or specific goals or objectives of the Beaverhead-Deerlodge National Forest Plan.*
4	**BC Forest Facts. 2003. "Wildfire in British Columbia." September.** "Wildfire is a natural part of most ecosystems across British Columbia. It helps to renew the forest, maintain the diversity of plant and animal life, and keep insects and disease in check. It opens up dense forest to allow the growth of shrubs and grasses, creating browse for deer, moose, elk and other animals. It releases nutrients locked in slowly decaying logs." http://www.llbc.leg.bc.ca/public/PubDocs/bcdocs/364421/wildfire_bc.pdf **Review: Relevant to the Project** *This fact sheet from British Columbia talks about the role of wildfire in creating forest conditions and includes a discussion on the important of prescribed fire in managing forests. The Flint Foothils DEIS discusses fire as an important disturbance agent and proposes prescribed fire as a tool to achieve desired conditions. The content of the fact sheet is relevant, however not referenced in the analysis.*
4	**Bio-Medicine.org, 2001. "View of forest insects changing from pests to partners"** **Science Blog** "Beyond that, these insect attacks are actually nature's mechanism to help restore forest health on a long-term basis and in many cases should be allowed to run their course, according to Oregon State University scientists in a new study published this week in the journal Conservation Biology in Practice. Native insects work to thin trees, control crowding, reduce stress and lessen competition for water and nutrients, the researchers found. Some levels of insect herbivory, or plant-eating, may even be good for trees and forests, and in the long run produce as much or more tree growth. 'There is now evidence that in many cases forests are more healthy after an insect outbreak,' said Tim Schowalter, an OSU professor of entomology. 'The traditional view still is that forest insects are destructive, but we need a revolution in this way of thinking. The fact is we will never resolve our problems with catastrophic fires or insect epidemics until we restore forest health, and in this battle insects may well be our ally, not our enemy.' " http://news.bio-medicine.org/biology-news-2/View-of-forest-insects-changing-from-pests-to-partners-8940-1/ http://www.scienceblog.com/community/older/2001/C/200113890.html

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	Review: Not Relevant to the Project *The first link accesses a news – flash article, while the second accesses a blog; neither provided access to the full scientific report. From what could be accessed the discussion is focused on Pacific Northwest forests, and speaks to the benefits of insects to thinning forests. The current mountain pine beetle epidemic is not thinning the forests, rather is killing 5 inch and larger pine trees over the project area, with 100 percent of the pine (lodgepole, whitebark, and ponderosa) stands affected by mountain pine beetle. At endemic levels, the insect activity acts as the article indicates; however, the project area is part of a larger epidemic of mountain pine beetle.*
4	**Black, S.H. Ph.D. 2005. "Logging to Control Insects: The Science and Myths Behind Managing Forest Insect "Pests." A Synthesis of Independently Reviewed Research. The *Xerces* Society for Invertebrate Conservation, Portland, OR.** "Pine beetle suppression projects often fail because the basic underlying cause for the population outbreak has not changed (DeMars and Roettgering 1982). Typically, if a habitat favorable to high populations of western pine beetle persists, suppression—by whatever means—will probably fail. In summary, once bark beetles reach epidemic levels and cause extensive tree mortality, treatments aimed at reducing densities of the beetles are futile (Wood et al. 1985). Logging can also lead to heightened insect activity. Soil and roots can be compacted following logging, leading to greater water stress. Soil damage resulting from logging with heavy equipment can increase the susceptibility of future forests to insects and disease (Hagle and Schmitz 1993, Hughes and Drever 2001). Salvage logging after insect outbreaks also can make matters worse by removing snags, parasites, and predators from the forest system (Nebeker 1989). Outbreaks could then be prolonged because of a reduction in the effectiveness of natural enemies (Nebeker 1989). Standing dead trees are important for several birds that feed on mountain pine beetles; these birds are important regulators of endemic beetle populations that keep the risk of epidemics down (Steeger et al. 1998). Widespread removal of dead and dying trees eliminates the habitat required by bird species that feed on those insects attacking living trees, with the result that outbreaks of pests may increase in size or frequency (Torgerson et al. 1990). Logged stands have less diverse architecture and overall lower seed production than untouched stands. Consequently, logged stands have lower arthropod and small mammal diversity than undisturbed stands (Simard and Fryxell 2003). Mass annihilation of wood-decaying macrofungi and insect microhabitats from logging has an extremely detrimental effect on arthropod diversity (Komonen 2003), including on the natural enemies of pest insects. Sanitation and salvage logging differ from natural disturbance in their effects and tend to decrease habitat complexity and diversity, which can lead to an increase in insect activity (Hughes and Drever 2001). Large-scale efforts for beetle control are economically and ecologically expensive, and the uncertain benefits of control efforts should be weighed carefully against their costs (Hughes and Drever 2001). Former U.S. Forest Service Chief Jack Ward Thomas, in testimony before the U.S. Senate Subcommittee on Agricultural Research, Conservation, Forestry, and General Legislation on August 29, 1994, acknowledged that "the Forest Service logs in insect-infested stands not to protect the ecology of the area, but to remove trees before their timber commodity value is reduced by the insects." http://www.xerces.org/wp-content/uploads/2008/10/logging_to_control_insects.pdf

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	Review: Relevant to the Project *The conclusion of this citation is that "logging is not the solution to forest insect outbreaks" and "some amount of insect activity is inevitable…and epidemics of these agents are increasingly recognized as symptoms of, not reasons for, poor forest health. Rather than combat insects as pests, we should view their population swings as indicators of changing conditions in these forests and seek to address the underlying causes." This analysis does consider that the current beetle epidemic and budworm populations are cyclic in conifer stands in the project area, and are an indication of an adequate supply of suitable hosts within the Forest. The analysis does not consider logging as a solution to the forest insect outbreak, rather is a response to the changes in the forest because of the insects.*
4	**Black, Scott Hoffman Ph.D., Entomologist/Ecologist and Executive Director, "Logging to Control Insects: The Science and Myths Behind Managing Forest Insect 'Pests'" The *Xerces* Society for Invertebrate Conservation 2005.** "Insects, including those that feed on and sometimes kill trees, are integral components of healthy forest ecosystems. They help decompose and recycle nutrients, build soils, maintain genetic diversity within tree species, generate snags and down logs that wildlife and fish rely on, and provide food for birds and small mammals. Although insects have been a part of the ecology of temperate forests for millennia, many in the timber industry see them only as agents of destruction. Some foresters believe the solution to the problem is increased logging. A review of over three hundred papers on the subject reveals that there is little or no evidence to support this assumption. There is an urgent need for federal and state agencies and land managers to reevaluate their current strategy for managing forest insects—which often relies on intensive logging—and to adopt a perspective that manages for forest ecosystem integrity." http://www.xerces.org/guidelines-logging-to-control-insects/ **Review: Relevant to the Project** *The conclusion of this citation is that "logging is not the solution to forest insect outbreaks" and "some amount of insect activity is inevitable…and epidemics of these agents are increasingly recognized as symptoms of, not reasons for, poor forest health. Rather than combat insects as pests, we should view their population swings as indicators of changing conditions in these forests and seek to address the underlying causes." This analysis does consider that the current beetle epidemic and budworm populations are cyclic in conifer stands in the project area, and are an indication of an adequate supply of suitable hosts within the Forest. The analysis does not consider logging as a solution to the forest insect outbreak, rather is a response to the changes in the forest because of the insects.*
4	**Black, Scott Hoffman Ph.D., Entomologist/Ecologist and Executive Director, The *Xerces* Society Excerpt from a 2008 comment letter to Alice Allen, Hell Canyon Ranger District, Black Hills National Forest.** "Mountain pine beetles, Ips beetle species, red turpentine beetles, and other wood boring beetles are all naturally occurring insects on the Black Hills, yet the USFS perceives these insects as a threat to the Forest ecosystem. These insect species do diminish the cash value of some conifers. Accordingly, concerted efforts have been made to rid public forests of what are called "pest insects". However, such a strategy is not wise or

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	feasible. Insects including those mentioned above are integral components of healthy forest ecosystems. These native species do less damage to the forest than the commercial logging program (which completely removes trees and nutrients from the ecosystem). In addition, these insect species are invaluable to the BHNF forest ecosystem. Insects help decompose and recycle nutrients, build soils, maintain genetic diversity within tree species, generate snags and down logs required by wildlife, and provide food to birds and small mammals. By feeding upon dead or dying trees, wood borers and bark beetles provide food to insect gleaning species of birds (such as the black backed woodpecker which is listed as a MIS species on this Forest), create snags that may be utilized by cavity nesting birds in the future and overall are invaluable catalysts in forest evolution – often aiding immensely in the regrowth of forest after fires, blowdowns or other naturally occurring stand removing processes. The potentially significant direct, indirect, and cumulative impacts upon insects and upon the niche of insects in the BHNF forest ecosystem should be thoroughly analyzed in the FEIS." http://www.xerces.org/wp-content/uploads/2008/09/black_hills_comments.pdf **Review: Not Relevant to the Project** *This reference is from a comment letter to a project on the Black Hills National Forest. Much of the comment letter is an offering of opinion on a forest type that does not occur on the Beaverhead-Deerlodge NF. Where the comment letter references specific science, the references are concerning Ips pini (pine engraver) and seven different species of land snails. Neither the pine engraver nor any of the seven different species of land snails are an issue in the Flint Foothills Project area.*
4	**Black, S. H. Ph.D., D. Kulakowski Ph.D., B.R. Noon Ph.D., and D. DellaSala Ph.D. 2010. "Insects and Roadless Forests: A Scientific Review of Causes, Consequences and Management Alternatives." National Center for Conservation Science & Policy, Ashland OR.** "Even forest thinning, which is widely promoted as a solution by reducing tree susceptibility to outbreaks, has had mixed results and is unlikely to stem bark beetle epidemics on a large landscape scale, especially during drought cycles. Further, this type of thinning would not be a one-time treatment, but would require regular thinning of all treated stands every decade or so because thinning tends to promote rapid growth of understory vegetation, making it a potential fuel ladder. Moreover, too much thinning can moderate stand climates, which may be favorable to some beetles, and increase wind speeds adding to crown fire spread." "Scientists, land managers and residents of Colorado are concerned about how wildfire might affect our forests and communities. If the goal is to protect communities, fire-mitigation efforts should be focused around those communities and homes, not in remote and ecologically valuable areas." "These forests may look different to us, but beetle-affected forests are still functioning ecosystems that provide food and shelter for animals, cool clear water for fish and humans, and irreplaceable refuges for wildlife from the effects of logging, road building and climate change." (Pp 23 and 24) http://www.geosinstitute.org/images/stories/pdfs/Publications/RoadlessAreas/FireandBugReport.pdf **Review: Not Relevant to the Project** *This paper addresses the proposal to exempt national forest roadless areas in Colorado from protections under the 2001 Roadless Area*

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	Conservation Rule, in part to address insect outbreak and perceived fire risk in these forests. While several findings (1, 2, and 8) apply to the Flint Foothills project, the Flint Foothills project is in Montana and not in a roadless area. The Flint Foothills project does not purport to stem bark beetle epidemics on a large landscape scale through forest thinning in forest types that Colorado has (lodgepole pine).The thinning proposed with the Flint Foothills Project is limited to thinning of Douglas-fir and ponderosa pine stands, and is designed to reduce stand densities to maintain or improve resilient forest conditions (per Forest Plan objectives, FP pg. 43).The remainder of the proposal is salvage harvest of already dead lodgepole pine. It does not propose to affect wildfire, either in a general forest setting or adjacent to homes or communities. The proposal affects 6 percent of the project area with harvest activities, retaining over 94 percent of the project area as "refugia for wildlife from the effects of logging, road building and climate change."
4	**Board on Agriculture. 1998 "Forested Landscapes in Perspective: Prospects and Opportunities for Sustainable Management of America's Nonfederal Forests"** "The definition of forest health is continually being reevaluated. For instance, where once forest fires and insect infestations were seen as indicators of unhealthy forests, and thus great effort was made to suppress them, forest landowners and managers today are appreciating the long-term contributions that these conditions can make to a healthy ecosystem. It may be said that the standards by which we measure forest health are determined by the objectives we aspire to. Forests managed for maximum timber yield will require different criteria for judging forest health than those managed for old-growth forest purposes. Likewise, the health of forests adjacent to or in urban communities will be judged with criteria that are quite different from those used to judge forests in rural areas where population densities are quite low." http://www.nap.edu/catalog.php?record_id=5492 **Review: Not Relevant to the Project** *The link provided accessed executive summary of the aforementioned book Forested Landscapes in Perspective: Prospects and Opportunities for Sustainable Management of America's Non-Federal Forests. The summary and book address the role and importance of forests of other ownerships with respect to the goods and services they provide and the role the federal government has in promoting sound forestry on lands of other ownership. The Flint Foothills project is on National Forest Systems land.*
4	**Bond, Monica L., Derek E. Lee, Curtis M. Bradley and Chad T. Hanson "Influence of Pre-Fire Tree Mortality on Fire Severity in Conifer Forests of the San Bernardino Mountains, California" *The Open Forest Science Journal*, 2009, 2, 41-47.** "These results indicate that widespread removal of dead trees may not effectively reduce higher-severity fire in southern California's conifer forests. We found that sample locations dominated by the largest size class of trees (>61 cm diameter at breast height (dbh)) burned at lower severities than locations dominated by trees 28-60 cm dbh. This result suggests that harvesting larger-sized trees for fire-severity reduction purposes is likely to be ineffective and possibly counter-productive." (Pg. 1) "We found that stands with recent high pre-fire tree mortality due to drought and insects did not burn at higher severity in coniferous forests of the San Bernardino Mountains, southern California, in the two fires we examined. Pollet and Omi [32] reported anecdotally that stands of lodgepole pine (P. contorta) that experienced an insect epidemic in the 1940s in Yellowstone National Park burned at lower severities compared to adjacent burned areas in the 1994 Robinson Fire. A widespread low-severity fire in subalpine forests in the White River National Forest, Colorado did not

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	burn any beetle-affected stands [13]. Further, Bebi et al. [12] found that stands of Engelmann spruce (Picea engelmannii) and subalpine fir (A. lasiocarpa) in the White River National Forest influenced by a spruce beetle outbreak in the 1940s did not show higher susceptibility to 303 subsequent forest fires that burned after 1950." (Pgs. 45 and 46) http://www.biologicaldiversity.org/publications/papers/Bond_et_al.pdf **Review: Not Relevant to the Project** *The Flint Foothills project does not propose to remove dead trees to reduce fire severity.*
4	**M. Borga, F. Tonelli, G. Dalla Fontana and F. Cazorzi. 2003. "Evaluating The Effects Of Forest Roads On Shallow Landsliding" Geophysical Research Abstracts, Vol. 5, 13312, 2003c European Geophysical Society 2003.** "Plot-level studies have demonstrated the ability of forest roads to intercept and route both subsurface and surface overland flow more efficiently to the stream network. Significant amount of subsurface throughflow can be intercepted by the road, as a function of the road cut depth and the current saturation deficit, and then redirected, concentrating the flow in particular areas below the road. Road drainage concentration increases the effective length of the channel network and strongly influences the distribution of erosional processes. The concept of wetness index has been used in the study as a surrogate for subsurface throughflow, and the effect of forest roads on subsurface throghflow rerouting has been assessed by evaluating the changes in terms of draining upslope areas. A threshold model for shallow slope instability has been used to analyse erosional impacts of drainage modifications. In the model, the occurrence of shallow landsliding is evaluated in terms of drainage areas, ground slope and soil properties (i.e., hydraulic conductivity, bulk density, and friction angle). The model has been used to generate hypotheses about the broader geomorphic effect of roads. Modelling results have been compared with available field data collected in north-eastern Italy." http://www.cosis.net/abstracts/EAE03/13312/EAE03-J-13312.pdf **Review: Relevant to the Project** *This article looks at the effects of roads on increasing shallow landslides. The study incorporates a conceptual model of the effect of forest roads on hillslope soil moisture and runoff generation into a hydro-geomechanical model for slope instability due to shallow landsliding. There were no observed shallow landslides in the project area from road failures. This article does explore the idea that hillslope soil moisture increases from roads could lead to future slope instability and channel network drainage extension from roads. BMPs will be used on roads used for this project that are demonstrated to be effective at reducing sediment derived from roads, and reducing the amount of connectedness between roads and streams.*
4	**Bosworth, Dale N. Chief USDA Forest Service, on Sustainable Management of the National Forests, at the Andrus Center for Public Policy, Boise State University December 12, 2001. (Excerpt from a speech)** "The American people have come to expect us to use the best science, and we ought to use the best science." (pg.4) http://www.andruscenter.org/images/transcripts/Sustainable_transcript.pdf

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	Review: Relevant to the Project *In Chief Bosworth's speech, not directly referencing the Flint Foothills Vegetation Management Project, the statement to use the best science was made in the context of the processes that are required for the Agency to make decisions. He states that the process can get bogged down and become a vicious cycle, making it difficult to make sustainable decisions. The Flint Foothills project analyses cite over 100 peer reviewed scientific documents used in the analysis.*
4	**Bosworth, Dale. Chief, USDA Forest Service, before the Committee on Energy and Natural Resources United States Senate March 3, 2004. (Excerpt from a statement)** "We are committed to accomplishing the aggressive treatments planned in the President's Budget for FY 2005 using new authorities in the Healthy Forests Restoration Act that improve the condition class of the nation's watersheds and thus protect communities and resources for future generations, and our Research Station directors are committed to providing the Forest Service with the best science available." http://www.ourforests.org/fact/bosworthtestimony0304.pdf **Review: Not Relevant to the Project** *This is from a speech Chief Bosworth gave to the Interior and related agencies appropriations subcommittee for the 2005 fiscal year budget request for the Forest Service. He talks about the four threats, or challenges facing the Forest Service—hazardous fuels, invasive species, loss of open space, and unmanaged outdoor recreation. With respect to fire(per the excerpt provided), Chief Bosworth focuses on the opportunities provided by Healthy Forests Restoration Act to improve forest and rangeland management, healthier landscapes, and reduced risk of catastrophic wildfires. The Flint Foothills Vegetation Management Project is not a HFRA project; the purpose and need does not include reducing the risk of wildfire.*
4	**Bowling, L.C., D. P. Lettenmaier, M. S. Wigmosta and W. A. Perkins "Predicting the Effects of Forest Roads on Streamflow using a Distributed Hydrological Model" from a poster presented at the fall meeting of the American Geophysica Union, San Francisco, CA, December 1996.** "A large scale land use experiment has taken place over the last 40 years in the mountainous areas of the northwestern U.S. through timber harvesting. This land use change effects the hydrology of an area through two mechanisms: Clear-cut logging which causes changes in the dynamics of Rain-On-Snow (ROS) events due to changes in the accumulation and ablation of snow caused by vegetation effects on snow interception and melt; and Construction and maintenance of forest roads which channel intercepted subsurface flow and infiltration excess runoff to the stream network more quickly." http://www.ce.washington.edu/~lxb/poster.html **Review: Relevant to the Project** *This article is from a non-peer-reviewed poster at a conference discussing a field data collection program in support of modeling to predict the*

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	relative effects of road drainage networks on streamflow in the Deschutes River Basin in Pacific Northwest. This poster highlights some of the hydrologic changes that can take place from forest roads. This article also looks at roads that are hydrologically connected to streams, and how this can lead to increases in streamflow, as demonstrated by a hydrologic model. The DEIS addresses potential flow increases as a result of the project. The hydrology of forest roads are discussed in the Hydrology Specialist report. Modeling was completed to address surface water flows and sediment yield on roads and flow connection to streams and potential sedimentation on haul roads. Results are shown in the hydrology specialists report.
4	**Bozeman Chronicle Staff, "Yellowstone fires have potential to grow much larger" *BozemanDailyChronicle*.com, September 24, 2009.** "Yellowstone is a 'fire-adapted ecosystem,' which means wildfire helps maintain the health of the area's wildlife and vegetation. Most park fires are caused by lightning and, whenever possible, monitored and managed, but not necessarily extinguished." http://www.bozemandailychronicle.com/news/article_a4e3e8b5-9304-5b6e-ab70-fa5e8009ff6e.html **Review: Not Relevant to the Project** *This is a press release in a local paper providing information on fires in Yellowstone National Park in 2009, and not a peer reviewed scientific paper. The fire information is not relevant to the Flint Foothills project.*
4	**Brister, Daniel. "A Review and Comment on: Forest Service Roads: A Synthesis of Scientific Information." 2nd Draft. USDA Forest Service. December 1998.** "Many of the conclusions and assumptions contained in the Roads Report are based on analysis of the positive contributions of roads. Negative socio-economic effects of roads have been, in large part, glossed over. The general view expressed in the Roads Report is that overall, roads make a positive socio-economic contribution." "The Socio-Economic Effects section has been constructed to overwhelmingly support the contention that the benefits of roads outweigh the costs. In order to arrive at such a conclusion, however, certain important economic costs and concepts have been omitted." "A serious problem with the Roads Report is its lack of discussion concerning the economic costs arising from the negative ecological effects of roads. Despite overwhelming scientific data linking roads and sedimentation (Bennett 1991; Grayson et al. 1993; Lyon 1984; Megahan 1980; McCashion and Rice 1983; Wade 1998; Williams 1998), the socio-economic costs of mitigating the effects of this sedimentation receive no mention in the Roads Report. Such costs are central to and should be included in any socio-economic assessment of forest roads." "The present road system constitutes a legacy of current and potential sources of damage to aquatic and riparian habitats, mostly through sedimentation, and to terrestrial habitats through fragmentation and increased access" (Amaranthus et all 1985)." "The failure of the Report to properly address mitigation costs associated with the ecological effects is a serious problem that needs to be addressed in future drafts. Similarly, passive-use values need to be taken seriously and considered throughout the Roads Report. In order to rectify these problems, most of the Socio-Economic Effects subsections will have to be reworked. Failing to do so, the Roads Report will paint an incomplete picture of the costs and benefits associated with the Forest Service's road program." http://www.wildlandscpr.org/forest-service-roads-synthesis-scientific-information-socio-economic-impacts

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	Review: Relevant to the Project *This report focuses on roads, highlighting the common economic perspective of roads. For the Flint Foothills Project, road work is limited to routes required to haul cut timber. Proposed road maintenance and reconstruction work would improve the ecological effects of existing roads.*
4	**Brown, Joel. "Power to the People!" *SRM Rangeland News*, November 2007** "On June 29, 2007, Chief of the Forest Service, Gail Kimbell expressed her support of employees participating in professional societies. The following is an excerpt from her support letter. As stewards of forests and rangelands, we must respond to the many challenges of managing a wide variety of resources and values. To meet these various challenges, a diverse and highly qualified cadre of natural resource and other professionals is critical to assure that management approaches are based on the best science. More than ever, it is important for each of us to continue to learn, enhance our resource knowledge, and develop innovative approaches to cooperatively conserve this Nation's natural resources." (pg. 5) http://www.rangelands.org/RN/Nov.RN07.pdf **Review: Not Relevant to the Project** *The Chief's quote, expressing her support of employees participating in professional societies, is included in a Society of Rangeland Management (SRM) newsletter, encouraging Society members to attend the SRM annual meeting. This is not relevant to the Flint Foothills Vegetation Management Project.*
1	**Bull, Evelyn L. 2001. "Effects of Disturbance on Forest Carnivores of Conservation Concern in Eastern Oregon and Washington." Pacific Northwest Research Station. Forestry and Range Sciences Laboratory. La Grande, OR**. "For example: Salvage or thinning operations that remove dead or decayed trees or coarse woody debris on the ground will reduce the availability of forest structures used by fishers and lynx. (Bull et al., 2001.)" http://www.vetmed.wsu.edu/org_NWS/NWSci%20journal%20articles/2001%20files/Special%20issue/v75sp%20p180%20Bull%20et%20al.PDF **Review: Relevant to the Project** *This published, peer-reviewed paper briefly summarizes ecological features associated with forest carnivore habitats and describes potential impacts to species' habitats as a result of management. The summary is derived from existing literature and provides recommended sources for additional information pertaining to forest carnivores. Bull et al. (2001) is referenced in the wildlife (fisher) section of the DEIS.*
4	**Bunnell, Fred L. Ph.D., Kelly A. Squires and Isabelle Houde. 2004. "Evaluating effects of large-scale salvage logging for mountain pine beetle on terrestrial and aquatic vertebrates." Mountain Pine Beetle Initiative Working Paper 1. Canadian Forest Service.** "Sediment input to freshwater is due to either the slower, large-scale process of soil erosion, or to rapid, localized "mass movements," such as landslides. Forest practices can increase the rate at which both processes occur. Most sediment from forestry arises from landslides from roads

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	and clearcuts on steep slopes, stream bank collapse after riparian harvesting, and soil erosion from logging roads and harvested areas. Roads, particularly those that are active for long periods of time, are likely the largest contributor of forestry-induced sediment (Furniss et al. 1991).” “Sediment can increase even when roads comprise just 3% of a basin (Cederholm et al. 1981).” “More than half the species present in the study area will likely be negatively impacted by sedimentation from logging roads.” “In areas made highly turbid (cloudy) from sedimentation, the foraging ability of adults and juveniles may be inhibited through decreased algal production and subsequent declines in insect abundance, or, for visual-feeding taxa dependent on good light, through their inability to find and capture food. Highly silted water may damage gill tissue and cause mortality or physiological stress of adults and juveniles.” http://warehouse.pfc.forestry.ca/pfc/25154.pdf **Review: Relevant to the Project** This article is from a Canadian Government publication. The article is about the effects of salvage logging on multiple species in Canada. Sediment generated from roads and landslides is identified as a possible impact to fish and water quality. In the article, it was thought that large-scale salvage operations are unlikely to result in positive impacts on freshwater fish. One of the main recommendations for mitigating effects for fish was to retain unharvested riparian buffers around wetlands and lakes. Riparian Conservation areas will be established for this project consistent with this recommendation. Further, effects of sedimentation are expected to be reduced in this project because BMPs that have been demonstrated to be effective will be used to control sedimentation that might occur as a result of this project. The Flint Foothills project includes design features and mitigations that minimize and reduce impacts of roads. Analysis of impacts to aquatic habitats and species are discussed in the EIS.
4	**Burns, James W., “Some Effects of Logging and Associated Road Construction on Northern California Streams.” Transactions of the American Fisheries Society, Volume 1, Number 1, January 1972.** “The road construction and right-of-way logging were immediately detrimental to most aquatic invertebrates in South Fork Caspar Creek” “Salmonid populations decreased immediately after the road construction.” “Sustained logging and associated road construction over a period of many years do not afford either the stream or the ‘fish population a chance to recover.” http://www.fs.fed.us/psw/publications/4351/Burns72.pdf **Review: Relevant to the Project** *This article is from a peer-reviewed publication. It looks at the effect of forest road construction on stream sedimentation. Sediment generated from roads is identified as a possible impact to fish and water quality in Northern California. Effects of sedimentation are expected to be reduced in this project because BMPs will be used to control sedimentation that might occur as a result of this project.*
4	**Buttenfield, Barbara P. Ph.D. and David R. Cameron. “Scale Effects and Attribute Resolution in Ecological Modeling.” A paper presented at 4th International Conference on Integrating GIS and Environmental Modeling. Banff, Alberta, Canada, September 2 – 8, 2000.** “In the temporal analysis, from 1950 to 1993, logging and road building in the study area clearly modified landscape patterns. Increased landscape fragmentation is evident in measures of smaller mean patch and core areas, reduced patch size variability, increased patch and edge density, and

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	higher edge contrast.” http://www.colorado.edu/research/cires/banff/pubpapers/158/ **Review: Relevant to the Project** *This paper reports a multi-scale landscape study of data collected in the Colorado San Juan Mountains. Results show that patterns of landscape structure differ with and without the imposition of roads as patch boundaries, and that these differences vary with species composition. The paper is an argument for ‘a reconsideration of functional scale that is based on attributes and process resolution’ or the computational mechanics of a GIS modeling exercise. The excerpt has relevance to the project and is discussed in the DEIS pertaining to large openings and road effects.*
4	**Byrd, Caroline and Nancy Debevoise. “Court Upholds Road-Building Moratorium.” Wyoming Outdoor Council. Frontline Newsletter, Winter 2000.** “Few human activities pose more of a threat to the well-being of wildlife and the integrity of forested watersheds than road building. Roads create human corridors that increase hunting pressure, particularly poaching, and fragment wildlife habitat into isolated islands, cutting animals off from their own species, food, water and cover, decreasing their chances of survival and making them more vulnerable to extinction.” “Forest roads also have overwhelmingly negative effects on fish habitat. Road cuts, ditches and shoulders generate stream sediment, which fills in pools and smothers streambed cobbles vital for spawning. Stream crossings and culverts can block fish from moving up and down stream. Roads introduce fuel, pesticides, toxins from oil and gas development and mining wastes into streams and increase the likelihood of toxic spills. In addition, roads accelerate soil erosion rates from 30 to 300 times, inviting catastrophic landslides that threaten the environment, human life and property.” http://www.wyomingoutdoorcouncil.org **Review: Not Relevant to the Project** *The referenced article was not available on the Council’s website. Per the citations provided, this is an opinion piece and not peer-reviewed literature. The Flint Foothills analysis addresses the effects of road construction on various wildlife species. The wildlife analysis contains references to peer-reviewed literature related to road impacts on wildlife and habitats.*
4	**Calvert, Jeffrey Ph.D. “A healthy forest needs bugs.” California Forest Stewardship Program, 2002.** “Television commercials tell us that the only good bug is a dead bug. But stop a moment and think about all the important jobs insects do: they pollinate plants including trees, provide food for fish, birds, and other creatures, help decompose dead material, and make nutrients available to the forest. Insects keep our forests healthy.” http://ceres.ca.gov/foreststeward/html/bugs.html **Review: Not Relevant to the Project**

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	This reference is an information bulletin from California Forest Stewardship Program on insect outbreaks. It is written for public land owners and explains in very simple terms, the vast role of insects in our forests. It explains some of the reasons for insect outbreaks, and provides recommendations on what the public/land owners should do when "pests" are abundant. The information on insects is relevant in a very general way; the recommendations are not relevant to the Flint Foothills Project.
4	**Campbell, John L. Ph.D, Dan C. Donato, Joe B. Fontaine., J. Boone Kauffman Ph.D., Beverly E. Law Ph.D., and Doug Robinson. "Biscuit Fire Study." Oregon State University Department of Forest Science Terrestrial Ecosystem Research and Regional Analysis. 2003.** "Recently burned areas represent an important type of habitat that many species of animals have evolved to utilize. Snags (standing dead trees) provide critical nesting and foraging habitat for birds and small mammals, and as they decay and fall, create additional habitat for small mammals and terrestrial amphibians as coarse woody debris." http://zircote.forestry.oregonstate.edu/terra/biscuit.htm **Review: Relevant to the Project** *The above quote is part of a summary statement supporting the relevance of a proposed scientific study concerning post-fire logging on the Biscuit Fire in southern Oregon. In the summary statement, only objectives are identified. No report containing study design, results, and conclusions was found. The wildlife analysis addresses snags as a source of wildlife habitat as well as the potential impacts to snag resources as a result of proposed activities.*
4	**Canadian Broadcasting Company News. June 17, 2009. "Fighting fire in the forest"** "Since those early days, millions of dollars have been spent on campaigns to prevent forest fires. But researchers now know that fire is not necessarily bad. It can be a natural part of a healthy grassland or forest ecosystem. Fire reduces the buildup of dead and decaying leaves, logs and needles that accumulate on the forest floor. It reduces or eliminates the overhead forest canopy, increasing the sunlight that stimulates new growth from seeds and roots. Many plants and animals have adapted to fire. Both lodgepole pine and jack pine have resin-sealed cones that stay on trees for many years. The heat of fire melts the resin and the cones pop open. Thousands of seeds then scatter to the ground and grow into new stands of pine. Woodpeckers feast on bark beetles and other insects that colonize in newly burned trees. And so, 20 years ago, Parks Canada decided that it wouldn't interfere in natural processes such as fire, insects and disease unless it had to — that is, unless people or neighbouring lands were threatened." http://www.cbc.ca/canada/story/2009/06/17/f-forest-fires.html **Review: Not Relevant to the Project** *This is a general news article about fighting forest fires in Canada, the ecological benefits of fire, and the effects fire has on weather, including the release of high volumes of greenhouse gas from wildfire. While the focus of the article is on wildfire, the prescribed burning proposed in the Flint*

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	Foothills project would realize some of the benefits provided in the excerpt in the context of the purpose and need for the proposal.
4	**Canadian Forest Service. 2003. "Native Forest Insects and Diseases"** "Native insects and diseases are intrinsic and necessary components of most terrestrial ecosystems. These and other natural disturbances, such as fire, are the drivers of forest diversity, structure, and function. Although at times devastating to the forest, they are necessary for the sustainability of forests (Aber and Melillo 1991, Attiwill 1994). Insects and diseases do cause economic harm. For the period 1982-1987, losses due to insects and diseases in Canada were estimated at over 100 million m3 annually or one third of the annual harvest (Hall and Moody 1994). Forest managers must balance volume loss without interfering with the necessary ecological functions that these agents provide to sustain a healthy forest." http://www.health.cfs.nrcan.gc.ca/BorealShield/nativeInsectsAndDiseases/ **Review: Not Relevant to the Project** *The link provided did not access the referenced paper. However, reading the excerpts provided, the analysis for the project recognizes the function of natural disturbances of insects and fire on forest diversity, structure and function, and with the scale of the project as compared to the untreated portions of the project area, does a reasonable job of balancing volume loss and economic recovery with allowing ecological functions to occur without management. (Vegetation section.)*
4	**Canadian Wildlife Service. 2005. Review notes sent to Robin Sharples, Environmental Assessment Coordinator, Government of the Yukon, Forest Management Branch. June 13, 2005 regarding the post-fire plans for the Barney Lake and False Canyon Creek fires.** "Lindenmayer et al. (2004), note that "To many ecologists, natural disturbances are key ecosystem processes rather than ecological disasters that require human repair"." http://www.emr.gov.yk.ca/pdf/barney_and_false_environment_canada.pdf **Review: Not Relevant to the Project** *The link provided did not access the referenced paper. However, based on the excerpts provided, the analysis for the Flint Foothills project recognizes the function of natural disturbances of insects and fire on forest diversity, structure and function, rather than an ecological disaster that requires human repair. (Vegetation section.)*
4	**Canfor Corporation, 2007. "Forest Protection – Insects"** "Insects are a part of the complex forest ecosystem. Like all parts of the ecosystem they have a role to play and they interact with many other components. This group of organisms is incredibly diverse and their ecosystem functions are equally diverse. The ecological role of insects ranges from benefactor to killer, with the beneficial insects being the most abundant. Pollination is an important role played by some insects. Wasps and bees pollinate flowering trees and shrubs. Speeding up decay is another insect function. Insects such as ants, termites and wood boring beetles bore into the wood of dead trees, speeding up the invasion of wood decaying microbes. Insects speed up nutrient cycling within the soil. Insects

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	such as collembolans, thysanurans, beetles, and flies feed on organic matter and fungi, speeding the flow of nutrients to the soil. Other insects can act as predators and parasites of herbivorous insect pests. Under normal conditions these natural enemies control these pest populations. Insects also act as food sources for many insectivorous birds, amphibians and mammals. These multiple roles indicate the complexity of insect functions in the forest ecosystem. Insects are involved in the ecological processes of the forest, including in forest stability, succession and productivity. Over time, the insect populations of the host tree, attacking insects and insect enemies fluctuate and end up regulating the composition and abundance of each. This impacts ecosystem stability. By feeding on unhealthy trees, insects help to re-cycle the nutrients from the dying trees to the healthy survivors. This maximizes the productivity of the average tree. The number of beneficial or non-harmful insect species in a forest is large. They play many essential roles within the forest ecosystem." http://www.canfor.com/treeschool/library/files/insects.asp **Review: Not Relevant to the Project** *The Canfor Corporation is a forest products company in Vancouver, British Columbia. This paper is a general discussion on insects and their ecological role; the "damage" they do to the forests; and the role of pest management practices. It concludes that applied ecology is critical with its emphasis on natural enemies and environmental conditions to help keep insect populations under control. The Flint Foothills project is not attempting to control insect populations; rather it is addressing conditions created by the current mountain pine beetle epidemic to meet Forest Plan objectives.*
4	**Christensen, Norman L. Jr., Ph.D., Testimony before the Senate Committee on Agriculture, Nutrition and Forestry regarding H.R. 1904—the Healthy Forests Restoration Act of 2003 June 26, 2003** "Why isn't it true that 'the more wood removed the better'? Why should 'big, old' trees be retained? First, larger-diameter woody materials do not pose a significant threat for wildfire ignition or spread. It is largely the finer fuels (a few inches and less in diameter) that carry fire. More important, large, old trees actually provide protection from fire spread because they are resistant to fire and their shade maintains favorable moisture conditions in the understory fuels. Too much thinning of the forest canopy can produce more rapid drying of such fuels and, thereby, more frequent and severe wildfire risk. Furthermore, big, old trees provide critical habitat and maintain key ecosystem functions." http://wwwpaztcn.wr.usgs.gov/fire/hr_1904_testimony_christensen.pdf **Review: Not Relevant to the Project** *This is a statement before the U.S Senate on the Healthy Forests Restoration Act of 2003. Mr. Christensen states his support of the intent of the legislation and provides five specific ways it should be improved. It contains no sources, references, or literature cited. Commercial thin treatments in the Flint Foothills project are designed to promote large tree characteristics in stands The comment that the more drying would lead to "more frequent and severe wildfire risk" is contradictory. The more frequently fires burn in a forested environment, the less intense and severe they will be. Hazardous fuels reduction is not part of the purpose and need of this project,*
4	**Christensen, Norman L. Jr. et al. excerpt from a September 9, 2002 letter to President Bush**

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	"In some areas the use of prescribed fire without any "thinning" would be the best restoration method. Indeed, many forests in the West do not require any treatment. These are forests that for thousands of years have burned at long intervals and only under drought conditions, and have been altered only minimally by 20th century fire suppression. These forests are still "healthy" and thinning would only disturb them, not "restore" them. In short, the variation among our forested landscapes is much too great for one treatment to be appropriate everywhere. Where thinning is used for restoration purposes in dry forest types, removal of small diameter material is most likely to have a net remedial effect. Brush and small trees, along with fine dead fuels lying atop the forest floor, constitute the most rapidly ignited component of dry forests (young forest stands regenerating after timber harvest often burn with the greatest intensity in western wildfires). They most surely post-date management-induced alteration of dry forest fire regimes. And their removal is not so likely to increase future fire intensity, for example from increased insulation and/or the drying effects of wind." http://docs.nrdc.org/land/files/lan_07062801g.pdf **Review: Not Relevant to the Project** *This is an opinion letter sent from a cadre of University leaders. Much of the caution suggested in the letter is actually incorporated in this project, wherein there is not a one sized action being prescribed, but a multitude of specific actions that vary depending on the vegetation type.*
4	**Cohen, Jack D. Ph.D. 1999. "Reducing the Wildland Fire Threat to Homes: Where and How Much?" Fire Sciences Laboratory, Rocky Mountain Research Station, Missoula, MT. USDA Forest Service Gen. Tech. Rep. PSW-GTR-173.** "These research conclusions redefine the WUI fire problem as a home ignitability issue largely independent of wildland fuel management issues. Consequently, this description has significant implications for the necessary actions and accompanying economic considerations for fire agencies. "The congruence of research findings from different analytical methods suggests that home ignitability is the principal cause of home losses during wildland fires. Any WUI home fire loss assessment method that does not account for home ignitability will be critically under specified and likely unreliable. Thus, land classification and mapping related to potential home loss must assess home ignitability." "As stated, the evidence indicates that home ignitions depend on the home materials and design and only those flammables within a few tens of meters of the home (home ignitability). The wildland fuel characteristics beyond the home site have little if any significance to WUI home fire losses." "Because homeowners typically assert their authority for the home and its immediate surroundings, the responsibility for effectively reducing home ignitability can only reside with the property owner rather than wildland agencies." http://www.fs.fed.us/rm/pubs_other/rmrs_1999_cohen_j001.pdf **Review: Not Relevant to the Project** *The citation references the flammability of structures within a defined urban interface, and defines who should be responsible for fuels treatments within wildland-urban interface (WUI) and the effectiveness of said treatments in reducing wildfire risk and spread. The Flint Foothills Project purpose and need does not include a reduction in the risk of wildfire and/or how it relates to ignition probability of structures within a defined*

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	wildland-urban interface. This paper discusses how wildland vegetation management could not necessarily protect a home from fire, and homeowners are ultimately responsible for protecting their homes from fire. Cohen states, "home ignitability, i.e., the potential for a home fire loss, is the homeowner's choice and responsibility." This paper does not state that vegetation management is not needed; in fact it discusses the need for management to enhance the ability to control fires in WUIs. This quotation has been taken out of context.
4	**Cohen, Jack D. Ph.D. 2003. "Structure Ignition Assessment Model (SIAM)" USDA Forest Service Gen. Tech. Rep. PSW-GTR-158. 1995.** "These results suggest that to reduce ignitions, the distances from a structure for managing vegetation are much smaller than the lofting distances for firebrands. Thus, beyond some relatively short distance from the structure (depending on the vegetation and topography), vegetation management has no significant benefit for reducing flame generated ignitions. Vegetation management, on the other hand, cannot be extensive enough, in a practical sense, to significantly reduce firebrand ignitions. Therefore, the structure and its immediate surroundings should be the focus for activities intended for improving ignition risk." "In high-density residential areas containing highly flammable structures (e.g., residences with flammable roofs), vegetation management may not be sufficient to prevent widespread fire destruction." (pg. 92) http://www.fs.fed.us/psw/publications/documents/psw_gtr158/psw_gtr158_05_cohen.pdf **Review: Not Relevant to the Project** *The citation references the effectiveness of thinning treatments, within a defined urban interface, on reducing wildfire risk. The Flint Foothills Project purpose and need does not include a reduction in the risk of wildfire and/or how it relates to ignition probability of structures within a defined wildland-urban interface.*
4	**Collins, Sally. Associate Chief USDA Forest Service. From a speech "Changing Public Land Uses: A Tale of Two Debates." Outdoor Writers Association of America, 76th Annual Conference, Columbia, MO-June 17, 2003.** "Where we do cut timber, it is usually a byproduct of forest health projects." "Our focus today in the Forest Service is no longer on logging and road-building. In the last 5 years, for example, we decommissioned 14 miles of road for every mile of road added to our forest road system. And where we do cut timber, it is usually a byproduct of forest health projects-like cutting 14-inch white fir to protect giant sequoia groves." http://www.fs.fed.us/news/2003/speeches/06/collins.shtml **Review: Not Relevant to the Project** *The speech by Forest Service Associate Chief Sally Collins addresses the changes in use of public land over time (reflected in the excerpt provided) and how Americans get their information on environmental issues from the media. She asks the audience of outdoor writers to do a better job of telling the story of the threats to long-term ecosystem health. While the Flint Foothills Vegetation Project reflects the changes in use of public lands, the speech is not directly relevant to the project.*

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4	**Collins, Sally. Associate Chief USDA Forest Service. From a speech “Protecting Open Spaces: Partners in a Common Cause.” Land Trust Alliance Rally. October 31, 2004.** “Always use the best science. Science can’t decide for us, but it can help us understand the consequences of our decisions. Forest Service Research and others in academia can deliver some of the best science and technical resources to help inform how these special areas should be managed for the long term.” http://www.fs.fed.us/news/2004/speeches/10/open-spaces.shtml **Review: Not Relevant to the Project** *The speech by Forest Service Associate Chief Sally Collins addresses the changes in use of public land over time and how Americans get their information on environmental issues from the media. She asks the audience of outdoor writers to do a better job of telling the story of the threats to long-term ecosystem health. The excerpt provided is an example Associate Chief Collins used to illustrate how public land use has changed. This speech is not specific to the Flint Foothills Vegetation Project. The project analysis considers the latest and best science available—over 100 references are cited in the analyses.*
4	**Collins, Sally. Associate Chief USDA Forest Service. From a speech “The Future of Partnering with the Forest Service.” Annual Meeting of the National Association of Conservation Districts. Atlanta, GA—February 8, 2005.** “Post-World War II, we entered a new period characterized by timber production. From the 1960s to the 1980s, every administration, with strong congressional support, called for more timber harvest from the national forests, with the goal of replacing the depleted stocks of private and state timber as a result of the war effort. We measured success largely in terms of producing timber and providing multiple uses, including outdoor recreation and fish and wildlife.In the early 1990s, that changed again. Today, we’re in a new period focused primarily on ecological restoration and recreation. Maybe more than ever before, we are focusing on delivering values and services like clean air and water, scenic beauty, habitat for wildlife, and opportunities for outdoor recreation. Not only do Americans want these things from their national forests, but this shift is also essential to cope with some huge threats to the sustainability of these forests.” (pp 8-9) http://www.fs.fed.us/spf/coop/library/NACDspeech.pdf **Review: Relevant to the Project** *This speech by Associate Chief Collins, shares perspectives on the history of the Forest Service and emphasizes the recent period focus on ecological restoration and recreation. Collins stresses the need to work through collaborative partnerships for long-term ecosystem health .The Flint Foothills project is not addressing forest health per se, rather, it is addressing conditions created by the current mountain pine beetle epidemic to meet Forest Plan objectives, including resiliency. Any Forest Service project benefits from collaborative partnerships.*
4	**Collins, Sally. Associate Chief USDA Forest Service. From testimony before the Committee on Energy and Natural Resources, United States Senate. July 11, 2006.**

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	"Our direction will address these emerging issues to ensure it is based on the available best science." http://www.fs.fed.us/congress/109/senate/oversight/collins/071106.html **Review: Not Relevant to the Project** *The testimony focuses on renewable energy on federal lands, with respect to the Energy Policy Act of 2005, involving energy-related leases and permits on Federal lands. .This testimony is not relevant to the Flint Foothills Vegetation Management Project. With respect to "the available best science," the Flint Foothills project considers the latest and best science available, with over 100 references cited in the analyses*
4	**Congressional Research Service. Report for Congress. "Forest Fire/Wildfire Protection." February 14, 2005.** "Finally, as mentioned above, wildfires can also generate benefits. Many plants regrow quickly following wildfires, because fire converts organic matter to available mineral nutrients. Some plant species, such as aspen and especially many native perennial grasses, also regrow from root systems that are rarely damaged by wildfire. Other plant species, such as lodgepole pine and jack pine, have evolved to depend on stand replacement fires for their regeneration; fire is required to open their cones and spread their seeds. One author identified research reporting various significant ecosystems threatened by fire exclusion — including aspen, whitebark pine, and Ponderosa pine (western montane ecosystems), longleaf pine, pitch pine, and oak savannah (southern and eastern ecosystems), and the tallgrass prairie. [57] Other researchers found that, of the 146 rare, threatened, or endangered plants in the coterminous 48 states for which there is conclusive information on fire effects, 135 species (92%) benefit from fire or are found in fire-adapted ecosystems." [58] "Animals, as well as plants, can benefit from fire. Some individual animals may be killed, especially by catastrophic fires, but populations and communities are rarely threatened. Many species are attracted to burned areas following fires — some even during or immediately after the fire. Species can be attracted by the newly available minerals or the reduced vegetation allowing them to see and catch prey. Others are attracted in the weeks to months (even a few years) following, to the new plant growth (including fresh and available seeds and berries), for insects and other prey, or for habitat (e.g., snags for woodpeckers and other cavity nesters). A few may be highly dependent on fire; the endangered Kirtland's warbler, for example, only nests under young jack pine that was regenerated by fire, because only fire-regenerated jack pine stands are dense enough to protect the nestlings from predators." In summary, many of the ecological benefits of wildfire that have become more widely recognized over the past 30 years are generally associated with light surface fires in frequent-fire ecosystems. This is clearly one of the justifications given for fuel treatments. Damage is likely to be greater from stand replacement fires, especially in frequent-fire ecosystems, but even crown fires produce benefits in some situations (e.g., for the jack pine regeneration needed for successful Kirtland's warbler nesting)." http://www.coloradofirecamp.com/congressional_research/forest-fire-wildfire-effects.htm **Review: Not Relevant to the Project** *The excerpt provided here is not included in the CRS report for Congress. The actual report addresses concerns over wildfires, the effects on the wildland urban interface, and forest and rangeland health. It discusses the deleterious effects that fire suppression has had with respect to creating*

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	unnatural fuel loading. The report concludes with an estimate of the acres at risk of ecological change, by historic fire regime. The purpose and need for the Flint Foothills Project does not include the reduction of fuels.With respect to the excerpt, we agree there are many benefits of wildfire, the Flint Foothills Project is not a fuels project and there is nothing in the purpose and need that addresses fuels.
4	**Crist, Michele Ph.D.and Ed Roworth Ph.D. "Cumulative effects of roads and logging on landscape structure in the San Juan Mountains, Colorado (USA)" *Landscape Ecology*, Volume 16, Number 4 / May, 2001.** "Overall, roads had a greater impact on landscape structure than logging in our study area. Indeed, the 3-fold increase in road density between 1950–1993 accounted for most of the changes in landscape configuration associated with mean patch size, edge density, and core area." McGarigal, Kevin Ph.D., William H. Romme Ph.D. http://www.springerlink.com/content/w12557624742tv77/ **Review: Relevant to the Project** *The study referenced Forest Service lands all above 7,872 feet in elevation in mixed conifer and subalpine spruce stands, which ecologically are different and at higher elevations than the dry lodgepole and Douglas-fir stands of the project are. While the geographic and biologic conditions differ, there are effects associated with past harvest and road construction to consider in in the Flint Foothills Project in combination with the proposed actions. These effects are discussed in the wildlife section of the DEIS.*
4	**Cushman, John H. Jr. "Audit Faults Forest Service on Logging Damage in U.S. Forests" *New York Times,* February 5, 1999** "Federal auditors have found that the Forest Service frequently fails to assess, prevent or correct environmental damage from logging on the national forests. After inspecting 12 timber projects in the field from 1995 to 1998, the Agriculture Department's inspector general found that all were deficient and that 'immediate corrective action is needed.' A new report on the audits found that the environmental studies required before logging was approved were poorly done, the rules to protect streams and wildlife habitat from undue damage during logging were not followed, and the steps planned to repair some of the harm after logging were not carried out. The inspector general, Roger C. Viadero, reported on Jan. 15 to Mike Dombeck, chief of the Forest Service, that the review had found ''numerous serious deficiencies.'' Agency officials generally agreed with the report's conclusions and recommendations." http://query.nytimes.com/gst/fullpage.html?res=9B00E2DF163BF936A35751C0A96F958260&sec=&spon=&pagewanted=print **Review: Relevant or Not Relevant to the Project** *The article cites an Agriculture Department inspector general's report, summarizing review of 12 timber sales from 1995-1998. The article states the report finds fault with both the environmental assessments for the projects and that "rules" were not followed when the sales were implemented on the ground. The report looked at a number of timber sale contracts and NEPA project-level analyses to determine compliance with mitigations and*

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	terms of the decisions and contracts. The article was not applied by the commenter to the site-specific aspect of this NEPA analysis. Programmatic reviews such as the one discussed in the article are not specific to the Flint Foothills Vegetation Management Project's site-specific environmental analysis.
4	**DellaSala, Dominick A. Ph.D. and Evan Frost. 2001. "A Comprehensive Strategy for Roadless Area Conservation and Fuels Reduction in Priority Areas"** "Some land managers and forest scientists advocate the widespread use of silvicultural treatments (of which thinning is the most widely proposed harvest-based fuels reduction method) in western roadless areas to reduce fuel loads and tree stocking levels, and thereby decrease the probability of large, intense fires. Although thinning within the context of intensive forestry is not new, its efficacy as a tool for fire hazard reduction at the landscape scale is controversial, largely unsubstantiated, and fundamentally experimental in nature thereby requiring caution particularly when applied across large landscapes." (FEMAT 1993, Henjum et al. 1994, DellaSala et al. 1995, SNEP 1996, USDA Forest Service 2000) "There have been only a few empirical studies that have tested the relationship between thinning or fuels treatment and fire behavior on even a limited basis. In spite of hypothesized benefits, these studies, as well as anecdotal information and analysis of recent fires, suggest that thinning treatments have highly variable results. In some instances, thinning treatments intended to reduce fire hazard appear to have the opposite effect (Huff et al. 1995, van Wagtendonk 1996, Weatherspoon 1996). Such treatments may reduce fuel loads, but they also allow more solar radiation and wind to reach the forest floor. The net effect is usually reduced fuel moisture and increased flammability." (Countryman 1955, Agee 1997) http://www.kettlerange.org/salvagelogging/DellaSala&Frost_Comprehensive_Strategy.html **Review: Not Relevant to the Project** *The paper summarizes available evidence on the relationship between fire and timber management in roaded vs. roadless areas, and evaluates the ecological impacts of silvicultural treatments and prescribed fire for fire hazard reduction in roadless areas. The quotation is from outdated sources and incorrect. The second portion of the quotation incorrectly cites Huff et al. (1995) because the Huff et al. (1995) paper does not mention thinning treatments that are "intended to reduce fire hazard" as "appearing to have the opposite effect." The Huff et al. (1995) paper doesn't mention the "intentions" of any treatments at all. Their analysis was based upon aerial photo interpretation without site- and treatment-specific data. Weatherspoon (1996, Fire-silviculture relationships in Sierra forests) discusses differences in tree damage due to 1987 wildfires in California in uncut areas and partially cut with fuel treatment areas. In the study the partially cut areas had, on the average, a higher degree of damage than the uncut areas even though fuels treatments had taken place. He offers several reasons for the results one of which is: "When only the management compartments containing fuel-treated stands (a small subset of the total number of compartments in the study) were analyzed separately, differences in fire damage between uncut and partial-cut and treated stands virtually disappeared. Evidently, lower average levels of damage in uncut stands in the remaining compartments changed the relationship in the overall analysis." In other words, he is saying that one reason for the treated stands appearing to have greater damage than the uncut stands was due to the way they combined and analyzed the data. The citation references the effectiveness of thinning projects and fuels treatments in reducing the risk of wildfire occurrence. The Flint Foothills Project purpose and need does not include a reduction in risk of wildfire, and the action alternatives do not propose harvesting in roadless areas.*
1	**DellaSala, Dominick A., Anne Martin, Randi Spivak, Todd Schulke, Bryan Bird, Marnie Criley, Chris van Daalen, Jake Kreilick, Rick Brown,**

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	and Greg Aplet, 2003. A Citizen's Call for Ecological Forest Restoration: Forest Restoration Principles and Criteria. Ecological Restoration, Vol. 21, No. 1, 2003 ISSN 1522-4740 **http://er.uwpress.org/cgi/reprint/21/1/14?maxtoshow=&hits=10&RESULTFORMAT=&author1=dellasala&andorexactfulltext=and&searchid=1&FIRSTINDEX=0&sortspec=relevance&volume=21&resourcetype=HWCIT** As related to letter 1, comment 35, additional literature to address **Review: Relevant to the Project** *The principles presented in this paper support this project's purpose and need, and therefore this paper is relevant to the project.*
4	**deMaynadier, Phillip G. and Malcolm L. Hunter, Jr. "Road Effects on Amphibian Movements in a Forested Landscape."** "The total area of land converted to road surface and shoulder clearance for permanent logging roads can represent a significant loss of former habitat in densely roaded regions. In this study, six acres of forest habitat were lost for every linear mile of road. Stewards of natural areas and managed forests who are concerned about the potential impacts of secondary roads on sensitive species should construct fewer and narrower roads with little or no edge clearance." http://www.magicalliance.org/Fragmentation/road_effects_on_amphibian_moveme.htm **Review: Relevant to the Project** *The effects of constructing 1.26 miles of new NFS road are addressed in the DEIS wildlife section. Temporary roads would be cleared to minimum widths needed and decommissioned upon completion of project activities.*
1	**Depro, Brooks M., Brian C. Murray, Ralph J. Alig, and Alyssa Shanks. 2008. "Public land, timber harvests, and climate mitigation: quantifying carbon sequestration potential on U.S. public timberlands."** ***Forest Ecology and Management*** **255: 1122-1134.** "Published scientific reports indicate that climate change will be exacerbated by logging due to the loss of carbon storage. Additionally, published scientific reports indicate that climate change will lead to increased wildfire severity (including drier and warmer conditions that may render obsolete the proposed effects of the Project). The former indicates that the Stonewall Vegetation Project may have a significant adverse effect on the environment, and the latter undermines the central underlying purpose of the Project. Therefore, the Forest Service must candidly disclose, consider, and fully discuss the published scientific papers discussing climate change in these two contexts. At least the Forest Service should discuss the attached following studies: http://www.fs.fed.us/pnw/pubs/journals/pnw_2008_depro001.pdf **Review: Not Relevant to the Project** *The Depro paper is an assessment of carbon sequestration for all public lands managed under two scenarios; a no action – no more harvest – scenario of all public lands, and a harvest-level-done-in-the-1980s scenario. The Flint Foothills Project does not propose to harvest at levels*

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	conducted in the 1980s, and is the scope of the project is not national in size. The scale of the analysis in Depro et. Al. paper is focused at the policy-level and its findings are not relevant at the project scale.
	Harmon, Mark E. et al. 2001. "Carbon sequestration in forests: addressing the scale question." *Journal of Forestry* 99:4: 24-29. http://docserver.ingentaconnect.com/deliver/connect/saf/00221201/v99n4/s5.pdf?expires=1288497231&id=59423682&titleid=3830&accname=National+Forest+Service+Library&checksum=E9C2B074CC129818DE1E86EC1EE5D415 **Review: Not Relevant to the Project** *This article could not be reviewed; the link does not work.*
	Harmon, Mark E, William K. Ferrell, and Jerry F. Franklin. 1990. "Effects of carbon storage of conversion of old-growth forest to young forests." *Science 247*: 4943: 699-702 http://www.sciencemag.org/cgi/reprint/247/4943/699.pdf **Review: Not Relevant to the Project** *This article is about the conversion (harvest) of old growth forests to young forest plantations in western Oregon and Washington. The Flint Foothills Project does not alter the status of old growth stands, and takes place in southwestern Montana.*
	Harmon, Mark E, and Barbara Marks. 2002. "Effects of silvicultural practices on carbon stores in Douglas-fir – western hemlock forests in the Pacific Northwest, USA: results from a simulation model". *Canadian Journal of Forest Research* 32: 863-877. http://article.pubs.nrc-cnrc.gc.ca/RPAS/rpv?hm=HInit&journal=cjfr&volume=32&calyLang=eng&afpf=x01-216.pdf **Review: Not Relevant to the Project** *This study occurs in the forest types of Oregon and Washington Cascade mountains. The conclusion of the modeling exercise is that an adequate supply of wood products may not be incompatible with a system that increases carbon stores. The forest types in the project area are not as productive and store less carbon than the Cascade forests.*
	Homann, Peter S., Mark Harmon, Suzanne Remillard, and Erica A.H. Smithwick. 2005. "What the soil reveals: potential total ecosystem C stores of the Pacific Northwest region, USA." *Forest Ecology and Management* 220: 270-283. http://www.fs.fed.us/pnw/pubs/journals/pnw_2005_homann001.pdf **Review: Relevant or Not Relevant to the Project** *This study occurs in the forest types of Oregon and Washington coast range to Cascade mountains. The forest types in the project area are not as productive with substantially less organic matter in soils with the dry, Continental forest types, and store less carbon than the western Oregon and Washington forests.*
	McKenzie, Donald, Ze'ev Gedalof, David L. Peterson, and Philip Mote. 2004. "Climatic change, wildfire, and conservation." *Conservation Biology* 18:4: 890 -902.

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	http://onlinelibrary.wiley.com/doi/10.1111/j.1523-1739.2004.00492.x/pdf **Review: Relevant to the Project** *This paper assesses the increases in amplitude and duration of extreme fire weather due to climate change, and that a resultant change in distribution and abundance of habitat to some sensitive plant and animal species may be affected. Although the paper is a general overview of potential change, the conclusion provided is that climatic change, fire policy, and fuel-treatment strategies are complex biosocial issues, and integrating them with wildlife conservation objectives is challenging. Though public distrust of motivations for conducting fuel treatments and agency frustration with appeals and litigation create a challenging ecological and social context for decision making, reasoned discussions among decision makers, public-land managers and stakeholders at local and regional scales can help to mitigate risk to ecosystems and sensitive species.*
4	**Diaz-Soltero, Hilda. Associate Chief for Natural Resources, USDA Forest Service. From an interview "Women in Natural Resources." Vol. 21, No. 3 August 2000.** "The agency has been able to face changing and challenging times and incorporate new information based on science." "I am very much involved in trying to integrate the science and the management sides of the Forest Service. It's very, very important that we conduct that integration, because our management decisions are scientifically based, and there is an ever increasing need for more scientific information." http://www.fs.fed.us/publications/2000/00nov02-Hilda-Diaz-Soltero-Interview.pdf **Review: Relevant to the Project** *The article documents an interview with then Associate Chief for Natural Resources. The excerpt is in the context of integrating forest inventories (i.e. FIA, NRIS) into the management side for decision making. The Flint Foothills Vegetation Management Project utilizes FIA data for its vegetation and wildlife analysis*
4	**Dombeck, Mike, Ph.D. USDA Forest Service Chief. Remarks made to Forest Service employees and retirees at the University of Montana. February 1998.** "Roads often cause serious ecological impacts. There are few more irreparable marks we can leave on the land than to build a road." **Review: Relevant to the Project** *In his speech, Chief Dombeck shares the core principles of his forthcoming natural resource agenda, which addresses watershed health and restoration, sustainable forest ecosystem management, forest roads and recreation; and shares highlights of the President's proposed FY99 budget. With respect to roads, Chief Dombeck states that forest roads are an essential part of the transportation system, providing benefits as well as causing serious ecological impacts. Thus, he proposed a new long-term forest road policy with four primary objectives: 1) More carefully consider decisions to build new roads. 2) Eliminate old unneeded roads. 3) Upgrade and maintain the roads important to public access. 4) Develop*

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	new and dependable funding for forest road management. The existing haul routes that would be used to haul timber from the Flint Foothills project area would receive needed maintenance work prior to any log hauling to reduce sediment delivery to adjacent streams. All temporary roads would be obliterated following harvest activities.
4	**Dombeck, Mike, Ph.D. USDA Forest Service Chief. "Forest Chief Shifts focus to clean water" April 1998 *Transitions* page 30. (Statement)** "The Forest Service must be a leader in using the best science and the best managers to accomplish what I think is one of the noblest, most important callings of our generation bringing people together and helping them find ways to live within the limits of the land." http://www.waterplanet.ws/transitions/tr9804/ **Review: Relevant or Not Relevant to the Project** *The speech, not directly referencing the Flint Foothills Project, focused on Chief Dombeck's vision for the agency, to leave the watersheds "healthier, more diverse and more productive." The use of the best available science will help accomplish the vision. The Flint Foothills project considers the latest and best science available—over 100 references are cited in the analyses*
4	**Dombeck, Mike, Ph.D. USDA Forest Service Chief. "Through the Woods" The News Hour with Jim Lehrer. 19 June 1998.** "The timber harvest shouldn't be dominant. It should be on an equal plane with recreation concerns, with wildlife concerns, hunting, fishing, protecting our cultural heritage. That's what the American public is asking us to do." http://www.pbs.org/newshour/bb/fedagencies/jan-june98/road_6-19.html **Review: Not Relevant to the Project** *In these transcripts from the Newshour with Jim Lehrer, the panel of participants discussed the potential impacts that an 18th month moratorium on road building in unroaded areas would have on the logging industry. The Idaho congressional delegation and industry representatives believe that the moratorium is political and will lead to locking up the national forests from timber harvest. Chief Dombeck's statement points out that timber harvest needs to be considered along with other uses. The Flint Foothills Vegetation Management Project does not propose road building in unroaded areas.*
4	**Dombeck, Mike, Ph.D. USDA Forest Service Chief. From a message on "Conservation Leadership" sent to all USDA FS employees on July 1, 1998.** "I recently read a letter from a line officer who chided local managers for being behind schedule relative to meeting the region's 'timber targets.' My expectation is that line officers will demand similar accountability for meeting watershed restoration, fish and wildlife habitat, riparian, recreation, cultural resource, and wilderness management goals." "We need to do a better job talking about, and managing for, the values that are so important to so many people. Values such as wilderness and roadless areas, clean water, protection of rare species, old growth forests, naturalness – these are the reasons most Americans cherish their public lands."

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	"Fifty years ago, Aldo Leopold wrote his seminal work, A Sand County Almanac. In it, Leopold spoke of his personal land ethic and the need for land managers to extend their own ecological conscience to resource decisions. The Forest Service natural resource agenda is an expression of our agency's land ethic. If we are to redeem our role as conservation leaders, it is not enough to be loyal to the Forest Service organization. First and foremost, we must be loyal to our land ethic. In fifty years, we will not be remembered for the resources we developed; we will be thanked for those we maintained and restored for future generations." http://www.wvhighlands.org/VoicePast/VoiceAug98/Dombeck.Aug98.html **Review: Not Relevant to the Project** *This is a message from then-Chief Mike Dombeck sharing his view with the National Leadership Team on what makes a "conservation leader" in the context of his natural resource agenda. It is not specific to any laws, regulations or policies that would be pertinent to the Flint Foothills analysis.*
4	**Dombeck, Mike, Ph.D. 2006. "Politics vs. Science" October 19, 2006 Published by the University of Wisconsin, Board of Regents. (Statements)** "The responsible policy maker ought to seek out the best science, because ultimately that will yield the best result.". "To put things in perspective, Dombeck says, "Science should not be the only driver of policy; there are economic, social and political concerns, but ... scientists can provide information that informs policymaking; 'If we adopt this policy, this will be the outcome,' and that certainly does not appear to be happening." " http://whyfiles.org/247sci_politics/index.php?g=5.txt **Review: Not Relevant to the Project** *The excerpt provided here is the retired Chief's response when asked why the government should fund research when it might not be in line with the government's political interest. At the time Dombeck was a professor of global environmental management at the University of Wisconsin-Stevens Point. He goes on to say that policy makers should seek out the best science to yield the best result, though his comment was not specific to the Flint Foothills Vegetation Management project. The Flint Foothills analyses consider the latest and best science available; over 100 references are cited in the analyses.*
1	**Drennan, J. and R. Beier. 2003. "Forest structure and prey abundance in winter habitat for northern goshawks." J. Wildlife Management 67:177-185.** **http://oak.ucc.nau.edu/pb1/vitae/Drennan-Beier-2003.pdf** As related to letter 1, comment 35; additional literature to address **Review: Relevant to the Project** *This published, peer-reviewed paper investigates movement, habitat structure, and prey associations for goshawks in north-central Arizona during*

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	the winter. Results of this study showed that goshawks within their study area were largely non-migratory, whereas the study describes more northerly birds as migratory in response to prey declines.
4	**Drever, Ronnie Ph.D. and Josie Hughes. 2001. "Salvaging Solutions: Science-based management of BC's pine beetle outbreak" A report commissioned by the David Suzuki Foundation, Forest Watch of British Columbia (a project of the Sierra Legal Defence Fund), and Canadian Parks and Wilderness Society – B.C. Chapter.** "On the basis of this review, we conclude that: "The mountain pine beetle and other bark beetles are native species and natural and important agents of renewal and succession in interior forests. Beetle outbreaks create diversity in forest structure, tree ages and species composition at stand and landscape scales, which are important for forest ecosystem health, diversity, and productivity. Beetle-killed trees provide ecological services and functions well beyond their death. At the landscape scale, beetle infestations create a mosaic of forest patches of various ages, densities, species composition and successional stages." "The current outbreak in central BC is a socio-economic challenge, rather than an ecological crisis. Mountain pine beetle outbreaks, like fire, are a natural disturbance to which interior forests are adapted and with which these forests have evolved for millennia." "Management interventions have never before controlled a large outbreak." "Sanitation and salvage clearcutting differ from natural disturbances in their effect on forest structure, and tend to reduce stand and landscape diversity. Natural disturbances vary in their intensity, frequency and magnitude, and amount and type of forest structure they retain. A large-scale clearcut is a stand replacement event that differs from a natural disturbance, especially in its intensity (percent of woody structures removed), frequency over time, and magnitude. Structural diversity at both the stand and landscape level is important for maintaining biodiversity and for the ability of ecosystems to resist and recover from fires, diseases, and other disturbances. Reducing stand and landscape diversity through harvesting may increase the susceptibility of these forests to large mountain pine beetle outbreaks in the future." "Current mountain pine beetle management fails to adequately ensure that ecological values are protected. The current legal framework allows 'emergency' exemptions from block-size requirements, terrain stability assessments, adjacency constraints and public review periods for operational plans. 'Emergency' logging may also occur in Old Growth Management Areas, Wildlife Habitat Areas, riparian reserves, Wildlife Tree Patches, Forest Ecosystem Networks, ungulate winter ranges, thus affecting the implementation of higher level planning, e.g., Land and Resource Management Plans." http://www.davidsuzuki.org/publications/downloads/2001/salvaging_solutions.pdf **Review: Not Relevant to the Project** *The document referenced is an assessment in how the British Columbia Ministry of Forests is managing the mountain pine beetle outbreak. Findings in the report include that the current outbreak in central BC is a socio-economic challenge; management interventions have never controlled a large outbreak; sanitation and salvage clearcutting differ from natural disturbances; allowable annual cuts in the beetle-affected area are too high; current MPB management fails to adequately ensure that ecological values are protected; design a planning process to ensure that environmental values are protected during sanitation harvests; and take an adaptive approach to MPB management. The Flint Foothill analysis*

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	does not state that there is an ecological crisis, and does not prescribe to the idea that management interventions can controlled a large outbreak. The analysis for this project does consider the differences in stand structure with natural disturbance and disturbance created by harvest; the magnitude of salvage by clearcut harvesting proposed with the project is about 6 percent of the project area, which allows for natural processes to occur over the majority of the area. Much of the linked document is specific to the laws and regulations for Canadian forests, and the resulting ecological ramifications of following the current management approach.
4	**Duncan, Sally Ph.D. "Postfire Logging: Is it Beneficial to a Forest?" USDA Forest Service. *PNW Science Findings* issue 47. October 2002.** "Trees killed by wildfire and left standing take on roles that change the ecological services they previously provided as components of a green-tree system. They still offer some shade, which in a burned environment can slow the heating of surface waters and the soil surface. They may also provide more rapid recruitment of large wood into streams. Decomposing fallen trees provide nutrients, shelter, and early structure for a rejuvenating forest floor." "Burned forests typically support significantly different bird communities, with many species dependent on stand-replacement fires to maintain their populations across the landscape. Usually there's an increase in cavity-nesting, insectivorous birds such as woodpeckers and certain species of flycatchers." http://www.fs.fed.us/pnw/sciencef/scifi47.pdf **Review: Relevant or Not Relevant to the Project** *This is an article that shares viewpoints both for and against post-fire logging; explains why "dead-tree harvest" levels increased dramatically in the 1990's; and what studies have been done to analyze the effects of post-fire logging. The Flint Foothills project proposes to thin and salvage dead and dying trees due to insect and disease infestations. It is not a post-fire project.*
4	**Dwyer, William. Federal Judge in his opinion text of Seattle Audubon Society v. Mosley, 798 F. Supp. 1484, 1489 (W.D. Wash. 1992)** "The Forest Service actions were a "systematic and deliberate refusal to comply with the nation's environmental laws." http://www.forestcouncil.org/learn/features/zerocut/mythfact.html **Review: Relevant or Not Relevant to the Project** *Judge Dwyer's statement is in reference to a 1991 lawsuit in the Pacific Northwest regarding the northern spotted owl. In general, the reference provided contains a combination of opinions and statistics ("myths" and "facts") from various organizations and agencies regarding logging national forests. Judge Dwyer's statement and the statements in the reference are not specific to the Flint Foothills Vegetation Management Project environmental analysis. The Flint Foothills project is in Montana, and not within the range of the northern spotted owl.*
4	**Eastern Forest Environmental Threat Assessment Center. U.S. Forest Service – Southern Research Station. Asheville NC. "Forest Fragmentation and Roads."** "Fragmentation caused by roads is of special interest because the effects of roads extend tens to hundreds of yards from the roads themselves,

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	altering habitats and water drainage patterns, disrupting wildlife movement, introducing exotic plant species, and increasing noise levels. The land development that follows roads out into rural areas usually leads to more roads, an expansion process that only ends at natural or legislated barriers." http://www.forestthreats.org/publications/su-srs-018/fragmentation **Review: Relevant to the Project** *This short summary of forest fragmentation and roads is presented at the national-scale. The effects of roads on wildlife and habitats is addressed in the DEIS wildlife section.*
1	**Ercelawn, A. 1999. End of the Road – The Adverse Ecological Impacts of Roads and Logging: A Compilation of Independently Reviewed Research. 130 pp. Natural Resources Defense Council. New York.** **http://www.nrdc.org/land/forests/roads/eotrinx.asp** As related to letter 1, comment 35; additional literature to address **Review: Relevant to the Project** *Chapter 4 of this website is titled Invasion by Harmful Exotic (non-Native) Plants and Animals. This chapter displays several articles discussing the invasion of nonnative species, how they spread into undisturbed areas and damages to ecosystem processes. The Invasive Plant Species section of the EIS agrees with many of the findings in this chapter. It discusses how roads are a vector of invasive species spread and establishment. It also discusses mitigation measures to help prevent invasive species spread and describes treatment successes in the past. This annotated bibliography provides an overview of primary research, almost all from peer-reviewed journals, documenting the adverse impacts of roads and logging on North American forest ecosystems. Though broad in coverage, there are portions of effects discussion that are relevant, therefore this document is considered in the project analysis. The reference contains a literature summary of key findings pertaining to road impacts to a number of species in a variety of geographic locations. The impacts of roads on streams are acknowledged and the Flint Foothills Project includes BMP maintenance on existing roads to reduce sedimentation impacts to streams and aquatic resources. Pertinent and applicable references are considered in the Flint Foothills wildlife analysis.*
1	**Ercelawn, A. 2000. Wildlife Species and Their Habitat: The Adverse Impacts of Logging – A Supplement to End of the Road. 41 pp. Natural Resources Defense Council. New York.** **http://www.nrdc.org/land/forests/eotrsupp.asp** As related to letter 1, comment 35; additional literature to address **Review: Relevant to the Project** *The reference contains a summary of reported findings associated with habitat studies where habitat impacts could occur as a result of logging.*

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	Summaries were generated for a variety of species in a variety of geographic locations. Pertinent and applicable references will be considered in the Flint Foothills wildlife analysis.
4	**Ehrlich, Anne Ph.D., David Foster Ph.D. and Peter Raven Ph.D. 2002. "Call to End Logging Based on Conservation Biology." Native Forest Network.** "For much of the past century the Forest Service, entrusted as the institutional steward of our National Forests, focused its management on an industrial-scale logging program. The result of the massive logging and road construction program was to damage watersheds, destroy wildlife habitat and imperil plant and animal species." http://www.nativeforest.org/campaigns/public_lands/stb_5_30_02.htm **Review: Not Relevant to the Project** *In 2003, 221 PhD-level scientists signed a letter to President Bush urging him to end commercial logging and road construction in National Forests and invest in forest restoration. They believe that protecting national forests creates more economic benefits than continued logging and advocate a shift in federal funding of the timber sale program into a program that pays local contractors to restore national forests. The authors' recommendations regarding the Federal timber sale program are not specific to the Flint Foothills project's site-specific environmental analysis.*
4	**Environmental Literacy Council. 2008. Forest Fires** "Wildfires are a natural occurrence and serve important ecosystem functions. Forest landscapes are dynamic and change in response to variations in climate and to disturbances from natural sources, such as fires caused by lightning strikes. Many tree species have evolved to take advantage of fire, and periodic burns can contribute to overall forest health. Fires typically move through burning lower branches and clearing dead wood from the forest floor which kick-starts regeneration by providing ideal growing conditions. It also improves floor habitat for many species that prefer relatively open spaces." http://www.enviroliteracy.org/article.php/46.html **Review: Not Relevant to the Project** *The article talks about wildfire, its role in ecosystem function, the consequences of past fire suppression and the resulting build-up of fuels, and the importance of balancing periodic fires and containment measures. The article is from a set of "teaching materials" on controlled burns. We agree with the statement information provided in the article and the Flint Foothills analysis discusses fire as a disturbance agent. The project, however, is not tied to wildfire and fire containment.*
4	**EPA entry into the Federal Register: March 3, 2000 (Volume 65, Number 43) Page 11675, "National Forest System Road Management."** "Few marks on the land are more lasting than roads." "The negative effects on the landscape of constructing new roads, deferring maintenance, and decommissioning old roads are well documented. Unwanted or non-native plant species can be transported on vehicles and clothing by users of roads, ultimately displacing native species. Roads

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	may fragment and degrade habitat for wildlife species and eliminate travel corridors of other species. Poorly designed or maintained roads promote erosion and landslides, degrading riparian and wetland habitat through sedimentation and changes in streamflow and water temperature, with associated reductions in fish habitat and productivity. Also, roads allow people to travel into previously difficult or impossible to access areas, resulting in indirect impacts such as ground and habitat disturbance, increased pressure on wildlife species, increased litter, sanitation needs and vandalism, and increased frequency of human-caused fires." http://www.epa.gov/fedrgstr/EPA-GENERAL/2000/March/Day-03/g5002.htm **Review: Not Relevant to the Project** *This is an excerpt from a March 3, 2000 Federal Register notice posted by the Forest Service. The Forest Service concluded that it needed to review its forest road system policy, one of four emphasis items in the agency's National Resource Agenda. The Agency proposed to revise 36 CFR Part 212 to shift the emphasis from transportation development to managing environmentally sound access. The Forest Service invited written comments to consider in development of the final rule and final administrative policy. This Federal Register notice does not have any direct bearing on the Flint Foothills Vegetation Management Project analysis. Road maintenance work would be conducted, where needed, on roads that would be used to haul timber to reduce sediment delivery to streams and would follow all agency policy. Temporary roads would be decommissioned at the conclusion of the authorized in line with agency policy.*
4	**Fahnestock, G.R. 1968. "Fire hazard from pre-commercially thinning ponderosa pine." Research Paper 57, USDA, Forest Service** "Fresh, dry slash of any species makes a high-intensity, unapproachable fire. A fire started in dry, fresh slash can become uncontrollable in seconds." (pg.12) "It appears significant that many large fires in the western United States have burned almost exclusively in slash. Some of these fires have stopped when they reached uncut timber; none has come to attention that started in green timber and stopped when it reached a slash area." (pg. 14) http://www.fs.fed.us/pnw/pubs/journals/pnw_1968_fahnestock001.pdf **Review: Not Relevant to the Project** *The Flint Foothills Project does not propose leaving untreated slash in the project area.*
4	**Federal Register / Vol. 69, No. 188, page 58056 Wednesday, September 29, 2004 Rules and Regulations** "The purpose of this interpretative rule is to clarify that, both for projects implementing plans and plan amendments, paragraph (a)'s mandate to use the best available science applies." http://www.fs.fed.us/r1//projects/plan_rule/intrpretative-rule.pdf **Review: Relevant Relevant to the Project** *This excerpt is from a Federal Register notice on 36 CFR part 219, National Forest System Land and Resource Management Planning; clarifying*

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	the intent of the transition section of the planning regulations concerning the use of the best available science in implementing land management plans. The notice is not specific to the Flint Foothills Vegetation Management Project, though the policy to use best available science is applied. The project's analyses cite over 100 references.
1	**Fire Effects Information System** "As a disturbance process, fire has the potential to greatly exacerbate infestations of certain noxious weed species, depending on burn severity and habitat type (Fire Effects Information System 2004)" http://www.fs.fed.us/database/feis/ **Review: Relevant to the project** *I assume the reference is referring to the document titled, Wildland Fire in ecosystems: fire and nonnative invasive plants. If so, this document is a review of information on relationships between wildland fire and nonnative invasive plants. This document synthesize ecological and botanical principles regarding relationships between wildland fire and nonnative invasive plants, identify the nonnative invasive species currently of greatest concern in major bioregions of the United States, and describe emerging fire-invasive issues in each bioregion and throughout the nation. This document was referenced in order to develop the Invasive Species portion of the DEIS. Chapter 8, Fire and Nonnative Invasive Plants in the Interior West Bioregion, provided excellent information for Western Montana.*
4	***Forest Conservation News Today*, August 27, 2002. "Bush Fire Policy: Clearing Forests So They Do Not Burn"** "The Bush administration has announced plans to greatly increase logging on federal lands in order to reduce the risk of wildfires. The Forest Service is using the fear of wildfires to allow logging companies to remove medium-and large-diameter trees that they can sell, rather than just the small trees and brush that can make fires more severe. There is little evidence to show that such logging will prevent catastrophic fires; on the contrary, logging roads and industrial logging cause wildfires. Bush is a well-known supporter of the timber industry and has accepted huge sums of money from wealthy timber company leaders. He is promoting misinformation about forest fires in order to benefit timber industry campaign contributors." http://forests.org/archived_site/today/recent/2002/tiporefl.htm **Review: Not Relevant to the Project** T*he article is an opinion piece and not a peer reviewed scientific study on President Bush's plan to "greatly increase logging on federal lands in order to reduce the risk of wildfires" (likely meaning the Healthy Forest Initiative).The commentary purports that Bush is providing misinformation to gain campaign contributions from the timber industry. The Flint Foothills Project purpose and need does not include an objective to reduce the risk of wildfire.*
4	**Forests.org. Portland Independent Media Center. Overview & Commentary, July 20, 2002** "It is well known scientifically that "commercial logging actually increases fire severity by removing large, fire- resistant trees and leaving behind very

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	small trees and flammable “slash debris”–branches, twigs and needles from felled trees. The removal of mature trees also decreases the forest canopy, creating hotter, drier conditions on the ground. The additional sun exposure encourages the growth of flammable brush and weeds. Reduction of flammable underbrush can reduce fire severity, and environmental groups have encouraged such projects. However, the Bush administration has grossly misused the funds that Congress appropriated for brush reduction near homes. In Sierra Nevada national forests last year, more than 90% of these funds were instead earmarked for preparation of large timber sales focused on the removal of mature and old-growth trees miles from the nearest town.” “’The Forest Service, Bush administration and anti-environmental members of Congress are spreading a great deal of misinformation about wildfire, hoping to capitalize on public fire hysteria and minimize public opposition to increased logging and roadbuilding in our national forests,” said Jake Kreilick of the National Forest Protection Alliance based in Missoula, Montana. “With virtually all new timber sales couched in terms of ‘reducing fuels’ or ‘restoring forest health,’ fire hysteria has emerged as the driving force behind the Forest Service’s logging program and the administration’s efforts to ‘streamline’ our nation’s environmental laws,’” Kreilick said. http://portland.indymedia.org/en/2002/08/17464.shtml **Review: Not Relevant to the Project** *The citation is an opinion piece and not a scientifically peer reviewed study. The citation references the effects of logging and/or fuels treatment on wildfire risk and severity reduction. The Flint Foothills Project purpose and need does not include a reduction in the risk or severity of wildfire.*
4	**Forman, Richard T. and Lauren E. Alexander “Roads and their Major Ecological Effects” Annual Review of Ecology and Systematics, Vol. 29: 207-231, November 1998.** “A huge road network with vehicles ramifies across the land, representing a surprising frontier of ecology. Species-rich roadsides are conduits for few species. Roadkills are a premier mortality source, yet except for local spots, rates rarely limit population size. Road avoidance, especially due to traffic noise, has a greater ecological impact. The still-more-important barrier effect subdivides populations, with demographic and probably genetic consequences. Road networks crossing landscapes cause local hydrologic and erosion effects, whereas stream networks and distant valleys receive major peak-flow and sediment impacts. Chemical effects mainly occur near roads. Road networks interrupt horizontal ecological flows, alter landscape spatial pattern, and therefore inhibit important interior species. Thus, road density and network structure are informative landscape ecology assays. Australia has huge road-reserve networks of native vegetation, whereas the Dutch have tunnels and overpasses perforating road barriers to enhance ecological flows. Based on road-effect zones, an estimated 15–20% of the United States is ecologically impacted by roads.” http://arjournals.annualreviews.org/doi/abs/10.1146/annurev.ecolsys.29.1.207?cookieSet=1&journalCode=ecolsys.1 **Review: Not Relevant to the Project** *The quoted section above is an abstract from this paper. Many of the effects discussed in this paper are those associated with paved, well-maintained, high-speed roads. However, it is recognized that lower-standard, unpaved Forest roads have effects as well. The effects of*

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	displacement and avoidance were addressed in the Forest Plan and provides wildlife secure habitat through management of open motorized road and trail densities. This direction is discussed in the Flint Foothills wildlife analysis. A couple of other effects discussed in the paper include potential for roadkill and barrier effects. The potential for roadkill as a result of this project is low, as only 7.2 miles of temporary road would be constructed, they would not be open to the public, and would be very low standard, low speed roads. Hauling on other roads has little potential as well, due to the rough (and low speed) nature of the roads. The paper states that road width and traffic density are major determinants of the barrier effect of roads. The temporary roads proposed under this project would be narrow, have little traffic and would be obliterated after use. The potential for these roads to be barriers to wildlife movement is low as discussed in the wildlife section of the DEIS.
4	**Fox, Joseph W., Ph.D. and Timothy Ingalsbee, Ph.D. "Fuel Reduction for Firefighter Safety." Published in the Proceedings of the International Wildland Fire Safety Summit. Winthrop, WA, Oct. 26-29, 1998.** "We question the assumption that canopy fuel reduction through commercial thinning is necessary or sufficient for reducing wildfire hazards and/or introducing prescribed fire. We cite evidence that logging-induced changes in fuel composition, vegetation, and microclimate can result in increased rate of fire spread, higher fireline intensity, and more severe fire effects. This, in turn, can affect firefighter safety and efficiency, and inflate suppression costs. Instead, treatment of surface and ladder fuels through prescribed fire combined with manual pre-treatments (for example, non-commercial thinning, pruning, and hand-piling) can effectively reduce the risk of crownfires, increase firefighter safety, and improve ecosystem health. These methods also promise employment opportunities for wildland firefighters and other forest workers." http://www.fire-ecology.org/research/fuel_reduction.htm **Review: Not Relevant to the Project** *We do not put forth the assumption that canopy fuel reduction through commercial thinning is necessary or sufficient to reduce wildfire hazards or introduce prescribed fire.The citation references the effects of commercial thinning on "wildfire hazards". The purpose and need does not include an objective to reduce the risk of crown fires, fireline intensity, or severity of wildfire.*
4	**Franklin, Jerry Ph.D., David Perry Ph.D., Reed Noss Ph.D., David Montgomery Ph.D. and Christopher Frissell Ph.D. 2000. "Simplified Forest Management to Achieve Watershed and Forest Health: A Critique."** "The proposition that forest values are protected with more, rather than less logging, and that forest reserves are not only unnecessary, but undesirable, has great appeal to many with a vested interest in maximizing timber harvest. These ideas are particularly attractive to institutions and individuals whose incomes depend upon a forest land base." "On the other hand, approaches that involve reserving of a portion of the land base, or harvest practices that leave commercially valuable trees uncut to achieve ecological goals, are often considered much less desirable as they reduce traditional sources of timber income." http://www.coastrange.org/documents/forestreport.pdf **Review: Relevant to the Project** *This document offers a perspective on whether cutting trees can help protect forest values. It is part of an ongoing debate about the role of*

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	silviculture in management and restoration.
4	**Franklin, Jerry F. Ph.D. and James K. Agee Ph.D. "Forging a Science-Based National Forest Fire Policy." Issues in Science and Technology Fall 2003.** "Natural forest disturbances, including fire, kill trees but remove very little of the total organic matter. Combustion rarely consumes more than 10 to 15 percent of the organic matter, even in stand-replacement fires, and often much less. Consequently, much of the forest remains in the form of live trees, standing dead trees, and logs on the ground. Also, many plants and animals typically survive such disturbances. This includes living trees, individually and in patches." "These surviving elements are biological legacies passed from the pre-disturbance ecosystem to the regenerating ecosystem that comes after. Biological legacies are crucial for ecological recovery. They may serve as lifeboats for many species, provide seed and other inocula, and enrich the structure of the regenerated forest. Large old trees, snags, and logs are critical wildlife habitat and, once removed, take a very long time to replace." http://inr.oregonstate.edu/download/forging_a_science_based_national_forest_fire_policy.pdf **Review: Not Relevant to the Project** *The excerpt is from a paper discussing the need for a comprehensive national forest fire and fuels policy grounded on scientific principles and data that considers all aspects of wildfire management—managing fuels, fire suppression, and post fire salvage and restoration. The citation references the effects of logging as part of fuels treatment on wildfire risk reduction. The Flint Foothills project is planned under current law, regulation and policy. The proposed action calls for harvest of dead and dying lodgepole pine affected by mountain pine beetle. The Flint Foothills Project purpose and need does not include an objective to reduce the risk of wildfire.*
4	**Franklin, Jerry F. Ph.D. and James K. Agee Ph.D. "Forging a Science-Based National Forest Fire Policy." Issues in Science and Technology 2007.** "The scientific consensus is that large and old trees should generally be retained, especially fire-resistant species such as pines. Indeed, from an ecological perspective these are absolutely the last trees that should be removed. Large and old trees are the most likely to survive a fire and subsequently serve as focal points for recovery. Large and old trees are also critical wildlife habitat, in part because they are the source of the standing dead trees (snags) and logs where animals live. Large old trees are essentially irreplaceable because they take centuries to reach that state." "Logging as a part of fuel treatment programs is an issue that deserves serious consideration by everyone in the forest fire policy debates. On the one hand, traditional commercial logging operations are unlikely to improve fuel loadings significantly or alter potential fire behavior for the better. Such operations are not focused on the key ground and ladder fuels, and they also contribute additional ground and ladder fuels in the form of debris called slash." http://www.issues.org/20.1/franklin.html

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	Review: Not Relevant to the Project *The excerpt is from a paper discussing the need for a comprehensive national forest fire and fuels policy grounded on scientific principles and data, that considers all aspects of wildfire management, not just managing fuels, fire suppression and post-fire salvage. The authors state that this policy "needs to deal with long-term management of fuels and wildfire and consider the full range of ecological and social values, including issues related to forest health and the well-being of communities and people." The Flint Foothills project is planned under current law, regulation and policy. The proposed action includes thinning old-growth understory to promote large, overstory ponderosa pine and Douglas-fir trees; and underburning in other treated stands to reduce understory vegetation. The purpose and need for the Flint Foothills Project does not include an objective to reduce fuels.*
4	**Frey, David "Logging Won't Halt Beetles, Fire, Report Says" NewWest.net, 3-03-10.** "The authors warned that cutting roads into current roadless areas could bring much more harm to wildlife, soil and fisheries than the beetle-killed trees pose to the forest." http://www.newwest.net/topic/article/logging_wont_halt_beetles_fire_report_says/C41/L41/ **Review: Not Relevant to the Project** *The excerpt is from an article reporting on a report by an Oregon-based conservation group, National Center for Conservation Science and Policy, which states efforts to log beetle-killed trees won't reduce fire risk or beetle outbreaks. The report authors encourage fuels project be focused around the edges of communities. The Flint Foothills Project purpose and need does not include an objective to reduce fire risk, or to reduce beetle outbreaks, and does not propose road building or vegetation management in current roadless areas.*
1	**Frissell, C. A. and D. Bayles. 1996. "Ecosystem Management And The Conservation Of Aquatic Biodiversity And Ecological Integrity." American Water Resources Association. *Water Resource Bulletin*. Vol. 32. No. 2. August 1996.** "If natural disturbance patterns are the best way to maintain or restore desired ecosystem values, then nature should be able to accomplish this task very well without human intervention (Frissell and Bayles, 1996). " http://www.landsinfo.org/ecosystem_defense/Science_Documents/Frissell_Bayles_1996.pdf **Review: Not Relevant to the Project** *This article appears to be an opinion piece about the need to maintain watershed reserves and is not applicable specifically to the Flint Foothills Project.*
4	**Furniss, Michael J., Michael Love Ph.D. and Sam A. Flanagan "Diversion Potential at Road-Stream Crossings." USDA Forest Service. 9777 1814—SDTDC. December 1997.** "Rarely can roads be designed and built that have no negative impacts on streams. Roads modify natural drainage patterns and can increase

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	hillslope erosion and downstream sedimentation. Sediments from road failures at stream crossings are deposited directly into stream habitats and can have both on-site and off-site effects. These include alterations of the channel pattern or morphology, increased bank erosion and changes in channel width, substrate composition, and stability of slopes adjacent to the channels." "All of these changes result in important biological consequences that can affect the entire stream ecosystem. One specific example involves anadromous salmonids, such as salmon and steelhead that have complex life histories and require suitable stream habitat to support both juvenile and adult life stages." "A healthy fishery requires access to suitable habitat that provides food, shelter, spawning gravel, suitable water quality, and access for upstream and downstream migration. Road-stream crossing failures have direct impacts on all of these components." http://www.stream.fs.fed.us/water-road/w-r-pdf/diversionpntl.pdf **Review: Relevant to the Project** *This article has been peer-reviewed, and looks at the potential for streams to be diverted onto roads. Stream crossings frequently have the potential to divert streams from their channel if the capacity of the crossing structure is exceeded. Road-stream crossings with diversion potential typically pose much greater overall sedimentation risks than those without diversion potential. Designing roads to avoid diversion potential is straightforward, and remediating existing crossings to correct diversion potential is usually inexpensive. A proposed haul route stream crossing in Alternative 2 will be designed to accommodate larger stream flows and reduce the risk of culvert failure and stream diversion (DEIS pageXXX) on to the road. Other crossings have been evaluated for sedimentation. Stream diversion potential as a result of the project is low for most streams in the project area because haul roads used for the project will be maintained, and have been designed to reduce diversion potential. Some risks do exist however with all roads. Very high flows in the summer of 2011 led to stream diversion in Upper Douglas Creek, causing massive erosion of the Douglas Creek Road. Efforts to maintain and design roads will be made as part of this project to avoid future road problems. BMPs will be used on roads used for this project that are demonstrated to be effective at reducing sediment derived from roads, and reducing the amount of connectedness between roads and streams. Analysis to aquatic species and habitat is discussed in the EIS.*
1	**Gabler, K., J. Laundre, and L. Heady. 2000. "Predicting the suitability of habitat in southeast Idaho for pygmy rabbits." J. Wildlife Manage. 64:759-764.** As related to letter 1, comment 35; additional literature to address **Review: Not Relevant to the Project** *This is a published paper that developed a GIS model for pygmy rabbit habitat in southeastern Idaho, which may be useful for predicting areas that are unsuitable for pygmy rabbits. The Flint Foothills Project area is located well north of the known distribution of pygmy rabbits. In addition, proposed activities are located outside potential pygmy rabbit habitats.*
4	**GAO. 1999. "Western National Forest, A Cohesive Strategy is needed to Address Catastrophic Wildfire Threats." GAO/RCED-99-65.** "Most of the trees that need to be removed to reduce accumulated fuels are small in diameter and have little or no commercial value." "Mechanically removing fuels (through commercial timber harvesting and other means) can also have adverse effects on wildlife habitat and water

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	quality in many areas. Officials told GAO that, because of these effects, a large-scale expansion of commercial timber harvesting alone for removing materials would not be feasible. However, because the Forest Service relies on the timber program for funding many of its activities, including reducing fuels, it has often used this program to address the wildfire problem. The difficulty with such an approach, however, is that the lands with commercially valuable timber are often not those with the greatest wildfire hazards." http://www.gao.gov/archive/1999/rc99065.pdf **Review: Not Relevant to the Project** *This report to Congress discusses fuel management and notes that the roles and responsibilities of the Federal and State governments in fire protection may be subject to further debate. The proposed action calls for harvest of dead and dying lodgepole pine affected by mountain pine beetle. The Flint Foothills Project purpose and need does not include an objective for fuel treatment or reduction. Slash created through harvest activities would be mitigated through whole tree yarding at central landing sites*
1	**Gedney, D. D. Azuma, C. Bolsinger, and N. McKay. 1999. Western Juniper in eastern Oregon. USDA Forest Service. Pacific Northwest Research Station. General Technical Report PNW-GTR-464.** As related to letter 1, comment 35; additional literature to address **Review: Not Relevant to the Project** *This published report analyzes and summarizes a 1988 inventory of western juniper (Juniperus occidentalis Hook.) in eastern Oregon. There is no western juniper within the project area.*
4	**Gerein, Keith "Notorious pine beetle may be misunderstood" *The Edmonton Journal,* March 21, 2009** "Scourge. Epidemic. Pest. All are words often used to describe the pine beetles currently wreaking havoc across large tracts of North America's forests. Yet nature is too complex for good-versus-evil characterizations, says Cameron Currie, an Edmonton-born scientist whose recent work has discovered a potential upside to the notorious bugs. While the pine beetle's power to destroy has been well-documented, it may also have the power to heal. Currie's research discovered the insect is associated with a bacterium containing an antibiotic compound that could eventually lead to new life-saving medicines." (Pg. 9) http://www.chetwyndecho.net **Review: Not Relevant to the Project** *This link takes one to the Chetwynd Echo, not the Edmonton Journal. The excerpt is from a March 27,2009 newspaper article in the Chetwynd Echo titled Mountain pine beetle could carry power to heal that focuses on symbiotic relationships between insects and other organisms. The mountain pine beetle is one example in the article. The Flint Foothills Project proposes to harvest the dead and dying host (lodgepole) and not the mountain pine beetle.*

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4	**Giuliano, Jackie Alan, Ph.D. "Fire Suppression Bush Style: Cut Down the Trees!" *Environment News Service*, 2008.** "But the majority of the protesters were angry about Bush's plans to implement rules that would thin our national forests to reduce fire risk. Cascadia Forest Alliance volunteer Carrie Taylor said Bush's plan to log mature and old forests "will only increase fire risks while providing taxpayer subsidized logs to the timber industry." "According to the Cascadia Forest Alliance, under the Bush proposal, 'environmental laws and citizen involvement will be undermined or suspended so that federal land management agencies can increase logging and roadbuilding on public lands, one of the timber industry's highest priorities.'" http://www.ens-newswire.com/ **Review: Not Relevant to the Project** *The excerpt is from an article reporting on a past protest in Portland, Oregon, over then- President's Bush's' forest policies, specifically " plans to implement rules that would thin our national forests to reduce fire risk." While the Flint Foothills Project does propose precommercial and commercial thinning, it is not a fuels reduction project and does not include an objective to reduce fire risk.*
4	**Glickman, Dan. Agriculture Secretary. 1999. From an Announcement of Interim Ban on Forest Road Construction Washington, D.C., February 11, 1999** "Our challenge is to protect all the different uses of our forests which well-kept roads undoubtedly serve while protecting these remaining untouched places. This is a long and delicate process. It will not happen overnight. We must rely on the best science and broad-based public participation. But in the interim, I am prepared to authorize an 18-month moratorium on the construction of new roads in the last pristine areas of our national forests." http://www.usda.gov/news/releases/1999/02/0056 **Review: Not Relevant to the Project** *This excerpt is from an introduction to Chief Mike Dombeck on the interim ban on forest road construction in certain unroaded areas while the Forest Service develops a revised road management policy. The Flint Foothills Project does not propose construction of roads into roadless areas. It does consider the latest and best science available—over 100 references are cited in the analyses.*
4	**Gorte, Ross W. Ph.D. "Forest Service Timber Sale Practices and Procedures: Analysis of Alternative Systems." A Congressional Research Service (CRS) report, October 30, 1995.** "The recent concern over the poor health of western pine ecosystems has been attributed at least partly to inappropriate silvicultural practices, both before and since the national forests were established. (4) Because of the timber industry's needs, logging in mixed conifer stands has emphasized cutting the large pines and leaving the true firs and Douglas-fir to dominate the remaining stands. (5) However, true firs and Douglas-fir are more susceptible to the damage (including insect and disease attacks as well as direct damage) that has occurred during the decade-long drought in the interior West, and thus may contribute to the risk of catastrophic wildfires. Salvage sales are one tool that can be used to improve forest health, (6)

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	but critics object to granting the agency the discretion to use timber sales to correct problems partially created by past timber sales." "A more general concern in some quarters is over Forest Service "bias" toward timber outputs, at the expense of ecosystem conditions and other resource values. While timber harvests are important, other important values are not measured, and managers are not rewarded for achieving these other values. (7) Some have attributed this "bias" to inappropriate incentives, particularly related to the agency's numerous trust funds and special accounts. (8) The Forest Service has several trust funds and special accounts that are either funded by timber revenues or provide funds for timber management (or both). (9)" "One trust fund often cited by critics is the Knutson-Vandenberg (K-V) Fund. This account receives an unlimited portion of timber sale receipts, to be used for reforestation, timber stand improvements, and other resource mitigation and enhancement activities in timber sale areas. Forest Service managers can, therefore, fund their programs from timber sales; in the words of one critic, wildlife managers have an incentive to support timber sales that damage wildlife habitat, because they can use the revenues to mitigate that damage and to keep themselves and their staffs employed. (10)" http://www.ncseonline.org/NLE/CRS/detail.cfm?do=do&OrderBy=Date&Category=Forests&CRScode=&Title=&Authors=&Keyword=&quickKeyword=&MaxCount=32&start=21 **Review: Not Relevant to the Project** *This report is an analysis and critique of the timber sale practices and procedures used by the Forest Service circa 1995 and analysis of alternatives to that system. Changes to the practices and procedures of the Forest Service timber sale system cannot be made or analyzed at the project level. The use of KV funds by the Forest Service is; FSH 2409.19 RENEWABLE RESOURCES HANDBOOK DIRECTION 13.0 Appropriate Use of CWKV Funds states that KV cannot be used to mitigate the effects of a timber sale.*
4	**Gorte, Ross W. Ph.D. from a CRS report for Congress, January 18, 2006.** "Research had documented that, in some situations, wildfires brought ecological benefits to the burned areas — aiding regeneration of native flora, improving the habitat of native fauna, and reducing infestations of pests and of exotic and invasive species." (pg 2) http://www.ncseonline.org/nle/crsreports/06Feb/RL30755.pdf **Review: Not Relevant to the Project** *This is a report to Congress concerning forestry practices, funding levels, and the federal role in wildland fire protection. It provides historical background on wildfires, and describes concerns about the wildland-urban interface and about forest and rangeland health. It discusses fuel management, fire control, and fire effects. The report then examines federal, state, and landowner roles and responsibilities in protecting lands and resources from wildfires. The purpose and need for the Flint Foothills project does not include an objective to manage fuels for future fire control, though post –logging fuels (slash) would be treated.*
4	**Grace, Johnny M. III Ph.D. 2003. "Minimizing the impacts of the forest road system." In: Proceedings of the conference 34 international erosion control association; ISSN 1092-2806. [Place of publication unknown]: International Erosion Control Association: 301-310.**

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	“Roads and skid trails have been identified as a major contributor to increased turbidity of water draining logging areas resulting in increases from 4 to 93 parts per million (Hoover, 1952). Forest roads have been found to have erosion rates from one to three orders of magnitude greater than similar undisturbed areas (Megahan, 1974) and perhaps account for as much as 90 percent of all forest erosion (Megahan, 1972). Forest roads can also cause soil erosion and stream sedimentation, which adversely impact on the nation’s water quality (Authur et al., 1998). http://www.srs.fs.usda.gov/pubs/ja/ja_grace011.pdf **Review: Relevant to the Project** *This peer –reviewed government report looks at sediment control systems that minimized sediment travel distances downslope of roads and their effectiveness at reducing the environmental impact of road systems in the southeast U.S. Sediment basin, sediment fence, and vegetation treatments were all evaluated. A similar technique for sediment reduction called filter windows or their equivalent will be used at all stream crossings for this project, and these have been demonstrated to be over 80% effective at reducing sediment delivery to streams (Seyedbagheri, 1986).*
1	**Graham, Russell T. et al. 1999. “The Effects of Thinning and Similar Stand Treatments on Fire Behavior in Western Forests.” United States Department of Agriculture, Forest Service, Pacific Northwest Research Station. United States Department of the Interior, Bureau of Land Management. General Technical Report PNW-GTR-463. September 1999.** “Please consider that tinning can result in faster fire spread than in the unthinned stand. Graham, et al., 1999 point out that fire modeling indicates: For example, the 20-foot wind speed must exceed 50 miles per hour for midflame wind speeds to reach 5 miles per hour within a dnese Stand (0.1 adjustment factor). In contrast, in an open stand (0.3 adjustment factor), the same midflame wind speeds would occur at only a 16-mile-per-hour wind at 20 feet. Graham, et al., 1999 also state: Depending on the type, intensity, and extent of thinning, or other treatment applied, fire behavior can be imporved (less severe and intense) or exacerbated.”…Fire intensity in thinned stands is greatly reduced if thinning is accompanied by reducing the surface fuels created by the cuttings. Fire has been successfully used to treat fuels and decrease the effects of wildfires especially in climax ponderosa pine forests (Deeming, 1990; Wagel and Eakle 1979; Weaver 1955, 1957). In contrast, extensive amounts of untreated logging slash contributed to the devastating fires during the late 1800s and early 1900s in the inland and Pacific Northwest forests. In their conclusion, Graham, et al., 199a state: Depending on intensity, thinning from below and possibly free thinning can most effectively alter fire behavior by reducing crown bulk density, increasing crown base height, and changing species composition to lighter crowned and fie-adapted species. Such intermediate treatments can reduce the severity and intensity of wildfires for a given set of physical and weather variables. But crown and selection thinning would not reduce crown fire potential.” http://www.fs.fed.us/r6/umpqua/projects/projectdocs/d-bug-ts/effects-of-thinning-on-fire-behavior-graham-et-al-1999.pdf **Review: Not Relevant to the Project** *This paper is one in a series of papers developed as background material for the Interior Columbia Basin Ecosystem management Project. It discusses the positive and negative effects that thinning has on crown fire potential. The quotes above are selective, as since the type of thinning done does make a difference (influences) to fire behavior. The Flint Foothills project proposes thinning from below; harvest treatments would be*

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	followed by underburning to reduce stand densities. The project does not have an objective to reduce crown fire potential and the effects from thinning on fire behavior are not analyzed.
3	**Green P. J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann. 1992. "Old-Growth Forest Types Of The Northern Region." R-1 SES 4/92; USDA Forest Service, Northern Region, Missoula, MT** "Please define and map all of the old growth in the project by each old growth type per Green et al. 1992" **Review: Relevant to the Project** *The paper describes the process to classify old growth forests based on habitat types. The old growth types for the Northern Region were developed for three different geographic areas within the Region: northern Idaho, western Montana, and eastern Montana. The request to define and map all of the old growth in the project by each old growth type per Green et al 1992 is not necessary and will not be done. The Forest Plan Vegetation Standard (1) directs that mechanical vegetation treatments and prescribed fire in old-growth stands do not reduce the age and number of large trees and basal area below the 'minimum criteria' required in Green et al. The direction provided is an old growth retention requirement, which this project does retain all existing old growth, regardless of the number of acres of old growth currently in the project area; therefore an inventory of existing old growth is not required and will not be done.*
4	**Gregory, Lisa Dale. Ph.D. "Wildland Fire Use: An Essential Fire Management Tool" A Wilderness Society Policy and Science Brief. December 2004.** "Ecologists and fire experts unanimously agree that fire has served an essential role in certain ecosystems for millennia. The ecological benefits of fire include: the creation of critical wildlife habitat in standing dead trees, increased nutrients and productivity in soil systems when burned material decomposes, improved conditions for surviving old growth trees when a surface fire moves through a system, and the regeneration of some fire dependent trees like lodgepole pine (Pinus contorta). Fire also increases availability of other fundamental building blocks of ecosystems such as moisture and sunshine by opening up the canopy and returning nutrients to the soil. Natural fire cycles maintain the diversity of habitats available to all the species in the ecosystem, from wildlife to wildflowers to fungi." http://wilderness.org/files/wildland-fire-use-essential-tool.pdf **Review: Relevant or Not Relevant to the Project** *The quote above provided from the article accurately discusses the beneficial effects derived from fire, but the article that the quote is from is about wildland fire use, and the promotion of wildland fire use on National Forest lands. This project does have prescribed burning as a part of the proposal, but does not address wildland fire use, as this tool is already available to the entire Beaverhead-Deerlodge NF through the current Forest Plan decision.*
4	**Gucinski, Hermann Ph.D., Michael J. Furniss, Robert R. Ziemer Ph.D. and Martha H. Brookes, Editors. 2001. "Forest Roads: A Synthesis of Scientific Information." USDA Forest Service, General Technical Report PNW-GTR-509.** "Roads have well-documented, short- and long-term effects on the environment that have become highly controversial, because of the value society

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	now places on unroaded wildlands and because of wilderness conflicts with resource extraction." "(Road) consequences include adverse effects on hydrology and geomorphic features (such as debris slides and sedimentation), habitat fragmentation, predation, road kill, invasion by exotic species, dispersal of pathogens, degraded water quality and chemical contamination, degraded aquatic habitat, use conflicts, destructive human actions (for example, trash dumping, illegal hunting, fires), lost solitude, depressed local economies, loss of soil productivity, and decline in biodiversity." http://www.fs.fed.us/pnw/pubs/gtr509.pdf **Review: Relevant to the Project** *This GTR focuses on roads. Road work is generally limited to routes required to haul cut timber, or work to improve the ecological effects of existing roads. This is relevant to the project. PNW-GTR-509 describes the effects roads have on ecosystems. It is a companion paper to Roads Analysis: Informing Decisions about Managing the National Forest Transportation System (USDA Forest Service 1999a). The report details the known issues related to road impacts on physical and biological resources, road impacts at various scales, and the socio-economics of roads. The report then describes the known science surrounding these issues. The focus of the report is to help the reader understand how roads function in the landscape.* *The Flint Foothills Project addresses the impacts that roads have on the landscape. New permanent roads (1.3 miles) constructed with this project would be closed to public use. 7.2 miles of temporary road would be constructed to access commercial then decommissioned following use. Approximate 0.5 miles of newly constructed temporary roads would be within RCAs (riparian conservation areas). All roads, existing and temporary, would be managed and maintained in accordance with Forest Service Soil and Water Conservation Practices (BMPs).* *This peer-reviewed report looks at some of the broader effects of roads including effects on hydrology, turbidity and sedimentation. Roads have three primary effects on hydrologic processes: (1) they intercept rainfall directly on the road surface and road cutbanks and affect subsurface water moving down the hillslope; (2) they concentrate flow, either on the surface or in an adjacent ditch or channel; and (3) they divert or reroute water from paths it otherwise would take were the road not present. They also can erode the surface of the road, and transport sediment downstream to where it may enter streams. As part of this project, BMPs will be used to reduce sedimentation from roads.*
4	**H. R. 1494 text. April 4, 2001** "SEC. 3. FINDINGS. Congress finds the following: Commercial logging has many indirect costs which are very significant, but not easily measured, such as flooding damage and relief of flooding damage through Federal funds, damage to the salmon fishing industry; and harm to the recreation and tourism industries." http://www.agriculturelaw.com/legis/bills107/hr1494.htm **Review: Not Relevant to the Project** *Citation is language from a proposed 2001 bill -- `National Forest Protection and Restoration Act of 2001–before the House of Representatives that did not become law. The objectives of the bill were to "save taxpayers money, reduce the deficit, cut corporate welfare, protect communities from*

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	wildfires, and protect and restore America's natural heritage by eliminating the fiscally wasteful and ecologically destructive commercial logging program on Federal public lands, restoring native biodiversity in our Federal public forests, and facilitating the economic recovery and diversification of communities affected by the Federal logging program." The USDA Forest Service Strategic Plan: 2007-2012 includes goals and objectives to maintain health, productivity, diversity, and resistance to unnaturally severe disturbances and to provide a sustainable supply of goods and services, including wood fiber. The Flint Foothills Vegetation Management Project is consistent with the Strategic Plan. At the forest-level, the Flint Foothills project implements direction in the Beaverhead-Deerlodge Forest Plan.
4	**Haney, Alan Ph.D. Introduction to the keynote presentation of the 8th annual Wisconsin Association of Lifelong Learning conference. University of Wisconsin Stevens Point, October 25, 2007.** "In 2007, we are witnessing one of the "worst" wildfire years in recent history, as measured in acres burned, suppression costs, and loss of property. We tend to view loss of property or timber value, and aesthetics. This perspective was greatly promoted by the U.S. Forest Service and the highly successful Smokey the Bear campaign that continues, albeit much reduced. When examined from a more objective, ecological perspective, the benefits of wildfire greatly exceed the negatives. This illustrated presentation examines the ecology of wildfire and presents the case that our anthropocentric perspective often clouds a more balanced understanding of nature where even bears are benefactors of fire." http://www.uwsp.edu/conted/wall/conference.aspx **Review: Not Relevant to the Project** *The document was not available at the link provided. The quote provided above appears to focus on a particular fire season and the view of that fire season as being negative; rather, the author of the article likely discusses the benefits of wildfires. The Flint Foothills Project analysis neither includes a recent wildfire and its effects within the analysis area nor discloses in the analysis that there are negative effects from fire.*
4	**Hann, W.J. et al. 1997 "Landscape dynamics of the Basin." Pp. 337-1,055 in: Quigley, T.M. and S.J. Arbelbide (eds.) *An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins: Volume II.* USDA Forest Service, PNW-GTR-405** "Fires in the roaded areas are more intense, due to drier conditions, wind zones on the foothill/valley interface, high surface-fuel loading, and dense stands." http://www.fs.fed.us/pnw/pubs/gtr405/pnw_gtr405aa.pdf **Review: Not Relevant to the Project** *Cannot download the reference from address provided; only the abstract, preface, science team members, volume contents and acknowledgements are available at this link. The Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins provides detailed information about current conditions and trends for the biophysical and social systems within the Basin. There is no context tying the excerpt to the Flint Foothills Project.*

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4	**Hanson, Chad Ph.D., "Commercial Logging Doesn't Prevent Catastrophic Fires, It Causes Them." Published in the *New York Times*, May 19, 2000.** "In April 1999, the General Accounting Office issued a report that raised serious questions about the use of timber sales as a tool of fire management. It noted that "most of the trees that need to be removed to reduce accumulated fuels are small in diameter" – the very trees that have 'little or no commercial value.' " "As it offers timber for sale to loggers, the Forest Service tends to 'focus on areas with high-value commercial timber rather than on areas with high fire hazards,' the report said. Its sales include 'more large, commercially valuable trees' than are necessary to reduce the so-called accumulated fuels (in other words, the trees that are most likely to burn in a forest fire)." "The truth is that timber sales are causing catastrophic wildfires on national forests, not alleviating them. The Sierra Nevada Ecosystem Project Report, issued in 1996 by the federal government, found that 'timber harvest, through its effects on forest structure, local microclimate and fuel accumulation, has increased fire severity more than any other recent human activity.' The reason goes back to the same conflict that the G.A.O. found: loggers want the big trees, not the little ones that act as fuel in forest fires." "After a 'thinning' timber sale, a forest has far fewer of the large trees, which are naturally fire-resistant because of their thick bark; indeed, many of these trees are centuries old and have already survived many fires. Without them, there is less shade. The forest is drier and hotter, making the remaining, smaller trees more susceptible to burning. After logging, forests also have accumulations of flammable debris known as "slash piles" – unsalable branches and limbs left by logging crews." http://www.commondreams.org/views/051900-101.htm **Review: Not Relevant to the Project** *This is an opinion piece critical of the Forest Service's use of commercial thinning as a tool to reduce the risk of catastrophic wildfires, citing the Los Alamos fire; an escaped prescribed burn conducted by the National Park Service, as an example. The author claims that thinning is an excuse by the Forest Service to provide high-volume commercial timber to the timber industry. The citation provided references the effects of thinning treatments to reduce wildfire risk. While the Flint Foothills Project does propose commercial thinning, the project's purpose and need does not include an objective to reduce the risk of wildfire.*
4	**Hanson, Chad, Ph.D. "Logging for Dollars in National Forests" Special to *The Sacramento Bee* – November 14, 2001.** "The Forest Service keeps the vast majority of timber sale revenues, which gives it a perverse incentive to do more cutting. It has developed a huge bureaucracy around the selling of timber from national forest land." http://www.johnmuirproject.org/news-logging-for-dollars.html **Review: Not Relevant to the Project** *This is an opinion piece against post-fire logging in old-growth stands in northern California. The author states that salvaging is an excuse to cut otherwise off-limits old-growth forests. The article cites literature that concludes post-fire logging does not reduce fire intensity in previously logged*

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	stands and that leaving large dead wood does not significantly increase the probability of a reburn. This article oversimplifies slightly outdated information and selectively pulls from voluminous FS and external science to paint a biased picture that logging after forest disturbance has no benefit. The Flint Foothills Project is not a post-fire salvage project.
4	**Hanson, Chad Ph.D. "Logging Industry Misleads on Climate and Forest Fires." Guest Commentary in *New West*, July 11, 2008** "Recent editorials by timber industry spokespersons are a wildly misleading attempt to promote increased logging of western U.S. forests under the guise of reducing wildland fires …" http://www.newwest.net/topic/article/logging_industry_misleads_on_climate_and_forest_fires/C41/L41/ **Review: Not Relevant to the Project** *This commentary refutes timber industry claims that logging reduces wildfire risks and mitigates climate change. The author cites studies that support his points. The Flint Foothills Vegetation Management Project purpose and need does not include an objective to reduce the risk of wildfire.*
4	**Hanson, Chad Ph.D. "New Report Debunks Myth of 'Catastrophic Wildfire" February 4, 2010** "We do not need to be afraid of the effects of wildland fire in our forests. Fire is doing important and beneficial ecological work," said the report's author, Dr. Chad Hanson, a forest and fire ecologist and Director of the John Muir Project. "It may seem counterintuitive, but the scientific evidence is telling us that some of the very best and richest wildlife habitat in western U.S. forests occurs where fire kills most or all of the trees. These areas are relatively rare on the landscape, and the many wildlife species that depend upon the habitat created by high-intensity fire are threatened by fire suppression and post-fire logging." http://johnmuirproject.org/documents/Myth%20of%20Catastrophic%20Wildfire%20Media%20Release.pdf **Review: Not Relevant to the Project** *The reference consists of a media release containing author's comments concerning a summary interpretation of wildfire status and ecological effects. The Flint Foothills Project does not contain or propose to treat areas of severely burned forest. While the media release is not relevant to the Flint Foothills wildlife analysis, several references used in the summary document that refer to black-backed woodpecker habitats will be considered for the analysis.*
4	**Harvey, A. E., M. J. Larsen, and M. F. Jurgensen "Distribution of Ectomycorrhizae in a Mature Douglas-fir/larch Forest Soil in Western Montana" *Forest Science*, Volume 22, Number 4, 1 December 1976 , pp. 393-398(6)** "Logging reduces the organic parent material (duff and woody residues) available for soil-formation processes." http://www.ingentaconnect.com/content/saf/fs/1976/00000022/00000004/art00007;jsessionid=l2sdf2hphia2.alexandra **Review: Relevant to the Project** *This paper describes the mineral and organic composition of a soil developed from limestone parent material at a location 10 miles south of Glacier*

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	National Park in Montana. The authors measured active ectomycorrhizae associated with the various organic and mineral components of the soil, and found that five percent of the active ectomycorrhizae occurred in the mineral fraction, 66 percent in the humus, 21 percent in the decayed wood, and 8 percent in the charcoal. From this information, they conclude that soil organic matter is important in the formation and activity of ectomycorrhizae in Douglas fir/larch timber types found in Western Montana. They emphasize that their results should only be applied to mature forests and are not applicable to young or regenerating forests. The habitat type (Douglas fir/larch) in the paper is not present in the Flint Foothills project area. The need to provide for organic matter is recognized in the DEIS. Project design features include leaving 7-12 tons per acre of coarse woody debris, per the recommendations of Graham and others (1994), which are the guidelines cited in the Northern Region Soil Quality Standards (USDA Forest Service 1999).
1	**Harvey et al. 1994**. "**Biotic and Abiotic Processes in Eastside Ecosystems: The Effects of Management on Soil Properties, Processes and Productivity." USDA Forest Service. Pacific Northwest Research Station. GTR 323.** "Harvey et al., 1994 state: The ...descriptions of microbial structures and processes suggest that they are likely to provide highly critical conduits for the input and movement of materials within soil and between the soil and the plant. Nitrogen and carbon have been mentioned and are probably the most important. Although the movement and cycling of many others are mediated by microbes, sulfur phosphorus, and iron compounds are important examples. The relation between forest soil microbes and N is striking. Virtually all N in eastside forest ecosystems is biologically fixed by microbes... Most forests, particularly in the inland West, are likely to be limited at some time during their development by supplies of plant-available N. Thus, to manage forest growth, we must manage the microbes that add most of the N and that make N available for subsequent plant uptake. (Internal citations omitted.)" http://www.fs.fed.us/pnw/pubs/pnw_gtr323.pdf **Review: Relevant to the Project** *Harvey and others (1994) review the effects of management on soil properties, processes, and productivity for eastern Washington and Oregon soils. Topics for "eastside soils" covered include physical and chemical properties, organic matter, microbiology, fire, fertilizer application, and the influence of weather and stand on soil water use in ponderosa pine. Since the paper covers a different geographical area, the specific information presented on eastside soils such as ash-influenced soil properties are not applicable; however, general information/concepts presented, such as that found in the Microbial Ecology section quoted in your comment, are relevant to the Flint Foothills project. We agree that microbial processes are important mediators in nutrient cycling in soils. By following prescribed project design features to limit the amount of detrimental soil disturbance associated with project activities and meeting the soil quality standards, these microbial-mediated soil functions would be provided for.*
4	**Haskell, David G. Ph.D. 1999. "Effects of Forest Roads on Macroinvertebrate Soil Fauna of the Southern Appalachian Mountains"** "Many forested landscapes are fragmented by roads, but our understanding of the effects of these roads on the function and diversity of the surrounding forest is in its infancy. I investigated the effect of roads in otherwise continuous forests on the macroinvertebrate fauna of the soil. I took soil samples along transects leading away from the edges of unpaved roads in the Cherokee National Forest in the Southern Appalachian mountains of the United States. Roads significantly depressed both the abundance and the richness of the macroinvertebrate soil fauna. Roads

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	also significantly reduced the depth of the leaf-litter layer. These effects persisted up to 100 m into the forest. Wider roads and roads with more open canopies tended to produce steeper declines in abundance, richness, and leaf-litter depth, but these effects were significant only for canopy cover and litter depth. The macroinvertebrate fauna of the leaf litter plays a pivotal role in the ability of the soil to process energy and nutrients. These macroinvertebrates also provide prey for vertebrate species such as salamanders and ground-foraging birds. The effect of roads on the surrounding forest is compounded by the sprawling nature of the road system in this and many other forests. My data suggest that even relatively narrow roads through forests can produce marked edge effects that may have negative consequences for the function and diversity of the forest ecosystem." http://www.jstor.org/stable/2641904 **Review: Not Relevant to the Project** *The text above is directly copied from the abstract of the paper. This study took place in Tennessee, in the Southern Appalachian Mountains with hardwood tree species; a completely different ecosystem than that of the Flint Foothills project area. In summary, the author found that roads significantly depressed the abundance and diversity of macroinvertebrates, due to a reduction in leaf litter, or habitat. We do not inventory macroinvertebrates directly in field surveys; however, complying with the Northern Region Soil Quality Standards would limit litter layer disturbance within the proposed harvest units. Permanent system roads are not considered part of the productive soil base. Temporary roads associated with Alternative 2 and Alternative 3 would be decommissioned (bermed and signed closed) or obliterated after harvest operations are completed and would recover litter layers over time as stand regeneration occurs.*
4	**Hawbaker, Todd J. Ph.D., Volker C. Radeloff Ph.D., Murray K. Clayton Ph.D., Roger B. Hammer Ph.D., and Charlotte E. Gonzalez-Abraham Ph.D. "Road Development, Housing Growth, and Landscape Fragmentation In Northern Wisconsin: 1937–1999" Ecological Applications: Vol. 16, No. 3, pp. 1222-1237.** "Roads remove habitat, alter adjacent areas, and interrupt and redirect ecological flows. They subdivide wildlife populations, foster invasive species spread, change the hydrologic network, and increase human use of adjacent areas. At broad scales, these impacts cumulate and define landscape patterns." http://www.esajournals.org/doi/abs/10.1890/1051-0761%282006%29016%5B1222%3ARDHGAL%5D2.0.CO%3B2?journalCode=ecap **Review: Not Relevant to the Project** *This is a peer-reviewed article on a study that looked at the influence of road networks over time and their effects on landscape patterns in Northern Wisconsin and is not relevant to public lands and forests in Montana or the Flint Foothills Project.*
1	**Hessburg PF and Lehmkuhl JF. 1999. Results of a blind scientific peer review of the Wenatchee National Forest's Dry Forest Strategy and a case study of its implementation in the Sand Creek Ecosystem Restoration Project. USDA Forest Service, Pacific Northwest Research Station.** As related to letter 1, comment 35; additional literature to address

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	Review: Not Relevant to the Project A blind scientific peer review of the Wenatchee National Forest's Dry Forest Strategy and a case study of its application in the Sand Creek Ecosystem Restoration Project was conducted. General questions were posed with respect to the application of the "strategy" in the Sand Creek project; specific questions were posed with respect to fire disturbance, bark beetle disturbance, soils, and wildlife. This dry forest strategy is applicable in eastern Washington ecosystems.
1	**Holt, D. W., and J. M. Hillis. 1987. "Current status and habitat association of forest owls in western Montana." USDA Forest Service, Gen. Tech. Rep. RM-142, Ft. Collins, CO.** "With the exception of the Spotted Owl…, the U.S. Forest Service has not given much emphasis to owl management. This is contrary to the National Forest Management Act of 1976 (NFMA) which mandates that all wildlife species be managed for viable populations. However, with over 500 vertebrate species this would be difficult for any organization. Recognizing the absence of detailed information on owl habitat, the apparent association of owls with snags, mature, and old-growth timber (both rapidly declining), it seems inconsistent that the U.S. Forest Service has placed little emphasis on owl management. One might conclude that the agency's painful experiences with the Spotted Owl in Oregon and Washington have evolved into a 'hear no evil, see no evil' approach for other forest owls as well." **Review: Relevant to the Project** *The paper was presented at a symposium in 1987 and consists of a summary of owl species status and distribution in western Montana. The paper also stresses the need to gain more baseline information on forest-dwelling owls. The BDNF Forest Plan manages for viable populations of wildlife, including owls. Effects to flammulated owls and great gray owls are addressed in the wildlife section of the DEIS.*
4	**Houston, Alan Ph.D., "Why Forestry is in Trouble with the Public." *Evergreen Magazine,* October 1997.** "For too long, we foresters took the public for granted, assuming unwavering support for those who grow the nation's wood fiber. Few noticed when the public's mood changed, and those who did were often ridiculed by disbelieving colleagues. Now we come to a day of reckoning: the public believes forests are too important to be entrusted to foresters. To restore lost confidence, foresters must first come out of hiding. We have a lot of explaining to do because, where forests are concerned, the public will no longer support what it cannot see and understand. Regaining the public's trust will take time. We must be prepared to answer hard questions about what we are doing and how our actions are impacting the environment. We must also help the public think through its forest management options. When we lay out these options, we must speak of much more than trees. Only then will our critics know we love forests as much as they do." http://evergreenmagazine.com/web/Why_forestry_is_in_trouble_with_the_public-v2.html **Review: Relevant to the Project** *This quote presents an interesting perspective on the interaction between forestry scientists and the public. It addresses the ongoing emphasis to work with the interested public in partnership in managing national forests, including the debate about whether active forest management can lead*

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	to healthier forest conditions than passive management.
4	**Hudak, Mike Ph.D. "From Prairie Dogs to Oysters: How Biodiversity Sustains Us" from his book review of The Work of Nature: How the Diversity of Life Sustains Us by Yvonne Baskin, 1997. Newsletter of Earth Day Southern Tier, February/March 1999, p. 2** "Human tampering with nature has not been without costs. Human manipulation of existing ecosystems has also sometimes had unfortunate consequences." http://www.mikehudak.com/Articles/FromPrairieDogs9902.html **Review: Not Relevant to the Project** *The article referenced is a book review, not a scientific study with peer review. Hudak states the book is written for the general audience and that it clearly explains environmental concepts and components, such biodiversity, ecosystem services and keystone species. He concludes that the reader can use the facts in the book to protect endangered species and other environmental components. The excerpt provided here is a cut/paste of two individual statements in the review.*
4	**Huff, Mark H. Ph.D.; Ottmar, Roger D.; Alvarado, Ernesto Ph.D. Vihnanek, Robert E.; Lehmkuhl, John F.; Hessburg, Paul F. Ph.D. Everett, Richard L. Ph.D. 1995. "Historical and current forest landscapes in eastern Oregon and Washington. Part II: Linking vegetation characteristics to potential fire behavior and related smoke production" Gen. Tech. Rep. PNW-GTR-355. USDA Forest Service, Pacific Northwest Research Station.** "In general, rate of spread and flame length were positively correlated with the proportion of area logged (hereafter, area logged) for the sample watersheds. Correlation coefficients of area logged with rate of spread were > 0.57 for five of the six river basins (table 5). Rate of spread for the Pend Oreille and Wenatchee River basins was strongly associated (r-0.89) with area logged. Correlation of areas logged with flame length were > 0.42 for four of six river basins (table 5). The Deschutes and Methow River basins showed the strongest relations. All harvest techniques were associated with increasing rate of spread and flame length, but strength of the associations differed greatly among river basins and harvesting methods." (pg.9) "As a by-product of clearcutting, thinning, and other tree-removal activities, activity fuels create both short- and long-term fire hazards to ecosystems. The potential rate of spread and intensity of fires associated with recently cut logging residues is high, especially the first year or two as the material decays. High fire-behavior hazards associated with the residues can extend, however, for many years depending on the tree. Even though these hazards diminish, their influence on fire behavior can linger for up to 30 years in the dry forest ecosystems of eastern Washington and Oregon." https://ir.library.oregonstate.edu/dspace/bitstream/1957/4706/1/PB96155213.pdf **Review: Not Relevant to the Project** *The paper referenced (Huff et al. 1995) above was an attempt to compare the potential fire behavior and smoke production of historical and current time periods for forty-nine 5,100 to 13,500 hectare watersheds. It was a landscape-level modeling exercise based upon vegetation type and timber*

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	harvest type classification from aerial photo interpretation of historic (1938-1959) and current (1985-1992) aerial photos. The authors used fuel behavior photo series to assign fuel loading by vegetation type for non-harvested areas and by harvest-type in harvested areas. Due to lack of site-specific information, they assigned a fire behavior photo series that matched older logging slash to the harvests, assuming in the process that no post-treatment fuels reduction treatments had ever taken place. They also only modeled surface and moderate- to low-intensity understory fires and constant weather and topographic conditions. *Although it produces interesting results, Huff et al. (1995) has little relevance to the Flint Foothills Project. The treatments proposed in the Flint Foothills Project include commercial and non-commercial thinning-from-below treatments, followed jackpot or pile burning. The fuels and fire behavior conditions created by the project will differ greatly than that modeled by Huff et al. (1995).* *The Flint Foothills Project purpose and need does not include harvest activities for fuel treatment or reduction. Slash created through harvest activities would be mitigated through whole tree yarding at central landing sites.*
4	**Hutto, Richard L. Ph.D. "The Ecology of Severely Burned Forests" *Counterpunch*, July 19 / 20, 2008.** "As summer wildfire season begins in earnest throughout much of the West, it's important for the public and policymakers to recognize the important role that severely burned forests play in maintaining wildlife populations and healthy forests. Severely burned forests are neither "destroyed" nor "lifeless." From my perspective as an ecologist, I have become aware of one of nature's best-kept secrets – there are some plant and animal species that one is hard-pressed to see anywhere outside a severely burned forest." "An appreciation of the biological uniqueness of severely burned forests is important because if we value and want to maintain the full variety of organisms with which we share this Earth, we must begin to recognize the healthy nature of severely burned forests. We must also begin to recognize that those are the very forests targeted for postfire logging activity. Unfortunately, postfire logging removes the very element – dense stands of dead trees – upon which many fire-dependent species depend for nest sites and food resources." http://www.counterpunch.org/hutto07192008.html **Review: Not Relevant to the Project** *This document is a commentary on the ecological aspects and benefits of severely burned forests. The Flint Foothills Project does not contain or propose to treat areas of severely burned forest.*
4	**Ingalsbee, Timothy Ph.D. "Logging for Firefighting: A Critical Analysis of the Quincy Library Group Fire Protection Plan." Unpublished research paper. 1997.** "The Quincy Library Group's (QLG's) fuelbreak strategy represents a giant step backwards from the progressive development of rational fire policies established by the 1995 Federal Wildland Fire Management Policy and Program Review." "The fact that the QLG admits that its Plan is inconsistent with these new policies (indeed, is almost gleefully defiant of them) says a lot about the credibility of the QLG's self-purported fire management expertise." "In spite of (or more likely because of) the intensive 'fuels reduction' activities associated with commercial logging, the Fountain Fire was truly catastrophic in its effects."

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	“Even ‘kinder, gentler’ commercial logging still inflicts environmental impacts such as eroded topsoil, degraded water quality, destroyed wildlife habitat, and extirpated species that are every bit as much symptoms of forest health problems as large-scale, severe wildfires.” “And after spending millions of dollars creating the SNEP Report, it seems wise to use its information, not ignore it or opportunistically select out statements clearly worded as assumptions, values, or goals which run contrary to factual research findings. The QLG Plan has much more to do with timber extraction than with genuine fire protection, and in that respect, it constitutes more of a forest health threat than a real solution.” “The QLG Bill resembles similar ‘panic legislation’ that was passed during the early 1970s in which, following some large-scale wildfires in California, Congress allowed the Forest Service to access emergency firefighting funds to conduct ‘presuppression’ timber sales. Many fuelbreaks were cut in the Sierras during this period, and while costs rapidly rose into tens of millions of dollars, most of these fuelbreaks failed to perform adequately during wildfire suppression incidents. Congress quickly had to take away this funding source from the Forest Service. What has become of these old fuelbreaks? Almost without exception, the agency failed to monitor or maintain them, and in a modern-day version of ‘cut and run’ logging, many of these old fuelbreaks have converted to chaparral brush and ‘dog-hair’ thickets … a much more flammable vegetation type than the original forest cover. The QLG Bill appears to be ‘deja vu’ without evidence of Congress or the QLG being aware of this history of previous fuelbreak programs.” http://www.fire-ecology.org/research/logging-for-firefighting_2.htm **Review: Not Relevant to the Project** *The citation is from an analysis of the Quincy Library Group Bill (H.R.858); the article references the effects of logging, thinning, and fuel reduction treatments on wildfire risk on QLG timber sale sites in California. The Flint Foothills Management Project in Montana is not subject to the QLG Plan. While the Flint Foothills project does propose thinning and clearcut salvage harvest, it is not a fuels reduction project and the purpose and need does not include construction of fuelbreaks or reduction in the risk of wildfire.*
4	**Ingalsbee, Timothy Ph.D. 2000. “Commercial Logging for Wildfire Prevention: Facts Vs. Fantasies”** “The notion that commercial logging can prevent wildfires has its believers and loud proponents, but this belief does not match up with the scientific evidence or history of federal management practices. In fact, it is widely recognized that past commercial logging, road-building, livestock grazing and aggressive firefighting are the sources for “forest health” problems such as increased insect infestations, disease outbreaks, and severe wildfires.” “How can the sources of these problems also be their solution? This internal contradiction needs more than propaganda to be resolved. It is time for the timber industry and their supporters to heed the facts, not fantasies, and develop forest management policies based on science, not politics.” http://www.fire-ecology.org/citizen/logging_and_wildfires.htm **Review: Not Relevant to the Project** *The definition of prevent is: To stop or to keep from happening. The first statement is incorrect in that the Forest Service does not maintain that commercial logging can prevent wildfires. To prevent wildfires, one would have to stop all human and natural (i.e. lightning) ignition sources.*

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	Vegetation treatments are done to modify fire intensity and severity. The rest of the comment is largely opinion, based upon the faulty premise of the first sentence. The Flint Foothills project doesn't propose to use commercial logging for wildfire prevention.
4	**Ingalsbee, Timothy Ph.D. "Logging without Limits isn't a Solution to Wildfires" published in the Portland Oregonian, August 6, 2002** "Since the 'New Perspectives' program of the early 1990s, the agency has tried to dodge public opposition to commercial logging by using various euphemisms, such as this gem from the Siskiyou National Forest: Clearcuts are called 'minimum green tree retention units.' Accordingly, Forest Service managers have believed that if they simply refer to logging as 'thinning,' or add the phrases 'fuels reduction' or 'forest restoration' to the title of their timber sale plans, then the public will accept these projects at face value, and business-as-usual commercial logging can proceed. In the face of multiple scandals and widespread public skepticism of the Forest Service's credibility, it seems that only Congress is buying the agency's labeling scheme." http://www.klamathforestalliance.org/Documents/loggingwithoutlimits.html **Review: Not Relevant to the Project** *This excerpt is from an opinion article in a newspaper where the author describes those activities he does and does not view as appropriate for fuels reduction. The Flint Foothills Project is not a fuels reduction project. For commercial-sized timber, there is a need to salvage dead and dying lodgepole pine trees to create managed stand conditions and capture the value of the wood product before it deteriorates; and a need to reduce forest densities to maintain or improve resilient forest conditions. The salvage is proposed to be accomplished through a regeneration clearcut harvest; the density reductions through commercial thinning, precommercial thinning and prescribed underburning.*
4	**Ingalsbee, Timothy Ph.D. "The wildland fires of 2002 illuminate fundamental questions about our relationship to fire." The Oregon Quarterly, Winter 2002.** "Thus, the use of commercial logging for fire hazard reduction poses yet another paradox: Logging removes the trees that normally survive fires, leaves behind the trees that are most often killed by fire, increases flammable fuel loads, and worsens fire weather conditions." (pg. 5) http://fireecology.org/research/wildfire_paradox.pdf **Review: Not Relevant to the Project** *This excerpt is from an opinion article published in a newpaper where the author states that society needs to "resolve some of the cultural and institutional paradoxes that characterize our relationship with forest fires" including the use of commercial logging for fire hazard reduction. With respect to thinning he believes that it can be used as a means of preparing forests for prescribed and wildlife fires. The purpose and need for the Flint Foothills Project does not include the use of commercial logging to reduce hazardous fuels.*
4	**Ingalsbee, Timothy Ph.D. "Fanning the Flames! The U.S. Forest Service: A Fire-Dependent Bureaucracy." *Missoula Independent*. Vol. 14 No. 24, June 2003.** "In the face of growing public scrutiny and criticism of the agency's logging policies and practices, the Forest Service and their enablers in Congress

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	have learned to mask timber sales as so-called 'fuels reduction' and 'forest restoration' projects. Yet, the net effect of these logging projects is to actually increase fire risks and fuel hazards." "Decades of encouraging private logging companies to take the biggest, oldest, most fire-resistant trees from public lands, while leaving behind a volatile fuel load of small trees, brush, weeds, stumps and slash has vastly increased the flammability of forestlands." "In addition to post-fire salvage logging, the Forest Service and timber industry advocates in Congress have been pushing pre-fire timber sales, often falsely billed as hazardous fuels reduction or 'thinning' projects, to lower the risk or hazard of future wildfires. In too many cases, these so-called thinning projects are logging thick-diameter fire-resistant overstory trees instead of or in addition to cutting thin-sized fire-susceptible understory trees. The resulting logging slash and the increased solar and wind exposure can paradoxically increase the fuel hazards and fire risks." http://www.fire-ecology.org/research/USFS_fire_dependent.html **Review: Not Relevant to the Project** *This is an opinion piece published in a newspaper in which the author discusses his disagreement with Forest Service forest and fire management policies. It contains no sources, references, or literature cited and is not a peer reviewed research paper. This project does not propose commercial logging to prevent wildfires.*
4	**Ingalsbee, Timothy Ph.D. 2005. "A Reporter's Guide to Wildland Fire." Published by the Firefighters United for Safety, Ethics, and Ecology (FUSE), January 2005.** "More than any other recent human activity, the legacy of commercial timber extraction has made public forests more flammable and less resilient to fire. Firstly, clearcut and high-grade logging have historically taken the largest, most fire-resilient, most commercially-valuable trees, and left behind dead needles and limbs (logging debris called "slash"), along with smaller trees and brush that are less commercially valuable but more flammable than mature and old-growth trees. The net effect is to increase the amount of available hazardous fuel." "Secondly, the removal of large overstory trees also changes the microclimate of logged sites, making them hotter, drier, and windier, which increases the intensity and rate of spread of wildfires. Third, the creation of densely-stocked even-aged plantations of young conifers made sites even more flammable since this produced a solid mass of highly combustible conifer needles within easy reach of surface flames. These changes in the fuel load, fuel profile, and microclimate make logged sites more prone to high-intensity and high-severity wildfires." http://www.fusee.org/docs/RptrsGuide_Chapters/RptrsGuide2007_web.pdf **Review: Not Relevant to the Project** *This is an opinion piece not a peer reviewed research paper. This project does not propose commercial logging to prevent wildfires. Slash created through harvest activities would be mitigated through whole tree yarding at central landing sites for disposal.*
4	**Ivins, Molly. Creators Syndicate, August 3 1997 08 03** "Last winter was unusually wet in the Pacific Northwest. The result was landslides all over caused by logging roads; five people died, spawning

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	streams were ruined, water supplies were contaminated and the flooding was tremendously aggravated. According to David Bayles, conservation director of the Pacific Rivers Council, aerial surveys documented more than 650 landslides in February in Washington and Oregon alone. The stupidest and most dangerous practice is allowing logging roads on steep slopes — that's really asking for it. You may ask yourself why the taxpayers are expected to pony up to build roads for profitable logging companies. Build roads for the timber companies in order to stimulate the U.S. logging, paper and building industries. There's just one problem. A lot of U.S. logs get shipped overseas, mostly to Japan. We're actually subsidizing Japanese companies while doing terrible damage to our environment and not helping the U.S. job scene much except when it comes to cutting Start with the assumption that the U.S. Forest Service a component of the Department of Agriculture, is simply an auxiliary branch of the timber industry and you'll pretty much have the picture of what's going on. Last winter, the Forest Service refused a bid at a timber auction from an environmentalist who wanted to save, not harvest, a stand of evergreens in the Okanogan National Forest in Washington. Instead, the Forest Service accepted a bid of $15,000 from a logging company that cut 3.5 million board-feet of lumber in that stand. Try to find a price like that at Home Depot." http://www.creators.com/opinion/molly-ivins/molly-ivins-august-3-1997-08-03.html **Review: Not Relevant to the Project** *These excerpts are from an opinion piece, none of which cite or are relevant to the Flint Foothills Vegetation Management Project. The Flint Foothills project is on NFS lands in Montana. Timber harvested from this area could not be exported to Japan: a provision of the Department of the Interior and Related Agencies Appropriation Act, 1974 (P.L. 93-120, October 4, 1973) prohibited the export of unprocessed timber harvested from Federal lands in the west. One section of System road construction is proposed in the Flint Foothills project to ensure the road is built to specification suitable for the steep terrain in the area.*
4	**Jalkotzy, M.G., P.I. Ross, and M.D. Nasserden. 1997. "The Effects of Linear Developments on Wildlife: A Review of Selected Scientific Literature." Prepared for Canadian Association of Petroleum Producers. Arc Wildlife Services Ltd., Calgary. 115pp.** "Linear developments may result in habitat avoidance for grizzly bears. Logging-truck traffic in the Kimsquit Valley in British Columbia resulted in a 78% reduction in use of the "Zone of Hauling Activity" by radio collared bears compared to non-hauling periods (16). For 14 hours/day, 3%-23% of each bear's home range was unavailable to them because of disturbance." "The impacts of land-use activities on wolverines are likely similar to those on grizzly bears. Wolverines seem to have been most affected by activities that fragment and supplant habitat, such as human settlement, extensive logging, oil and gas development, mining, recreational developments, and the accompanying access. Wolverine populations that are now at the edge of extirpation have been relegated to the last available habitat that has not been developed, extensively modified, or accessed by humans." http://citeseerx.ist.psu.edu **Review: Relevant to the Project**

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	This is a bibliography of papers, over 200 pages and it does not include an abstract of the papers. *The quoted portion above deals with grizzly bears, which are addressed in the wildlife section of the DEIS. It goes on to say that effects are likely similar for wolverines. Analysis for the Forest Plan recognized the potential effects of roads and human access on wildlife (including wolverine). As a result, the Forest Plan includes a secure area goal (measured by open motorized road and trail density), objectives to reduce open motorized road and trail density (OMRTD) in specific landscapes and hunting units, and standards to have no net increase in OMRTD in those areas where OMRTD objectives are exceeded.* *Analysis of the effects of this project on wildlife secure habitats and OMRTDs is found in the wildlife section of the DEIS (especially grizzly bear, wolverine, and elk sections).*
4	**Jones, Julia A. Ph.D., Frederick J. Swanson Ph.D. Beverley C. Wemple Ph.D., and Kai U. Snyder. “Effects of roads on hydrology, geomorphology, and disturbance patches in stream networks.” Conservation Biology 14, No. 1. 2000.** “Although disturbance patches are created by peak flow and debris flow disturbances in mountain landscapes without roads, roads can alter the landscape distributions of the starting and stopping points of debris flows, and they can alter the balance between the intensity of flood peaks and the stream network’s resistance to change.” http://www.jstor.org/stable/2641906 **Review: Relevant to the Project** *This peer-reviewed journal article looks at some of the effects of roads on debris flows and flood peaks in the H.J. Andrews Experimental Forest in the Cascade Mountains, Oregon. No debris flows were observed in the project area, and the climate and geology are significantly different from the study area in the article. Because of this difference, this article is only somewhat relevant to the project. The article has utility in that patch dynamics and recovery rates can be influenced by road-stream interactions, and better understanding these relationships can lead to better understanding of the effects of high-risk roads on streams and riparian systems. These conclusions are applicable to this project because it may be a useful way to further understand channel disturbance and recovery processes in the project area. These topics are not directly addressed in the DEIS, but the potential effects of roads and timber harvest on channels is disclosed in the Hydrology specialists report.*
1	**Juel, J. 2003. “Old Growth at a Crossroads: U.S. Forest Service Northern Region National Forests’ noncompliance with diversity provisions of their Forest Plans and the National Forest Management Act Regulations.” August, 2003. The Ecology Center, Inc. Missoula, Montana.** “Unfortunately, region-wide the FS has failed to meet Forest Plan old-growth standards, does not keep accurate old-growth inventories, and has not monitored population trends in response to management activities as required by Forest Plans and NFMA (Juel, 2003).” http://www.landsinfo.org/ecosystem_defense/Science_Documents/Juel_2003.pdf **Review: Not Relevant to the Project** *The report referenced above is not a scientific study with peer review, rather is a report to investigate how Forest Plans within Region 1 of the*

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	Forest Service were complied with in regards to old growth monitoring. The Beaverhead-Deerlodge NF Forest Plan is new since 2009, so the reference speaks to the old Forest Plans for the two original Forests, which are no longer providing direction.
4	**Kahklen, Keith. "A Method for Measuring Sediment Production from Forest Roads." Pacific Northwest Research Station, USDA Forest Service. Research note PNW-RN-529, April 2001.** "In the Pacific Northwest, the two main processes that contribute to sediment production are mass failure and surface erosion from forest roads (Fredriksen 1970, Reid and Dunne 1984). In the Clearwater River basin in the State of Washington, as much as 40 percent of the sediment produced in the watershed was attributed to logging roads (Reid 1980)." http://www.fs.fed.us/pnw/pubs/rn529.pdf **Review: Relevant to the Project** *This peer-reviewed government report is relevant to the project. Predicting sediment production from forest roads is necessary to determine their impact on watersheds and associated terrestrial and stream biota. This article provides a technique for evaluating sediment production from forest roads. Road WEPP was used in this project to evaluate sediment production from project haul roads and is discussed in the DEIS.*
4	**Karr, James R. Ph.D., Christopher A. Frissell Ph.D., Jonathan J. Rhodes, David L. Perry Ph.D. and G. Wayne Minshall Ph.D. Excerpt from a letter to the Subcommittee on Forests & Forest Health U.S. House of Representatives. 3 July, 2002.** "It is indisputable that roads are one of the greatest threats to the ecological integrity of forested systems and associated river, wetland, lake, and coastal ecosystems. Yet, the USFS has failed to adopt a policy that mandates reversing the worst ecological effects of roads, or that precludes incursion of roads into roadless areas. Despite widespread recognition of these facts, the USFS diverts staff and money to extraordinarily costly salvage logging projects at the expense of reducing the extent of the road network or undertaking needed fine-fuels reductions in unburned forests." http://www.nativeforest.org/campaigns/wildfire_info_center/letter_from_beschta.htm **Review: Not Relevant to the Project** *This article states the allegations that the Forest Service may have adopted a policy that does not reverse the ecological effects of roads. This article is not peer-reviewed and is a summary of the Beschta Report presented to Congress. Further, it states generalizations regarding roads and road management by the Forest Service that may or may not be applicable to this project. It does not contain data or analysis however, so observations made in this report may more broadly apply to roads management and other ecological effects.*
4	**Karr, James R. Ph.D., "Nature doesn't Benefit from Logging Fire-Damaged Lands". Op-Ed Tacoma News Tribune. December 8, 2005.** "Trees in a burned landscape, both dead and alive, continue to provide homes for wildlife after a fire and form the building blocks of new forests." www.landsinfo.org/ecosystem_defense/Science_Documents/Karr_2005.doc **Review: Not Relevant to the Project**

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	This article consists of an Op-Ed opinion addressing post-fire salvage logging. The Flint Foothills Project does not contain or propose to treat post-fire areas.
1	**Katzner, T., and K. Parker. 1997. Vegetative characteristics and size of home ranges used by pygmy rabbits (Brachylagus idahoensis) during winter. J. Mammology 78:1063-1072.** As related to letter 1, comment 35; additional literature to address **Review: Not Relevant to the Project** *This paper determined sizes of home ranges for pygmy rabbits in southwestern Wyoming and characterized the vegetation within and outside those areas used during winters of 1993 and 1994.The project area is located well north of the known distribution of pygmy rabbits. In addition, proposed activities are located outside potential pygmy rabbit habitats.*
4	**Kaufmann, Merrill R. "Good Fire, Bad Fire" Rocky Mountain Research Station. Fort Collins, CO, USDA Forest Service** "Carefully done science can provide common ground for agreement among different stakeholders, enabling communities to unify." "The best science available tells us that at some point we must reinstall this missing ecosystem process so the natural machinery functions properly again." (pg. 9) http://csfs.colostate.edu/pdfs/Good_Fire_Bad_Fire.pdf **Review: Not Relevant to the Project** *This excerpt is from a multi-agency and NGO brochure that is not peer-reviewed scientific literature. The emphasis of the brochure is "how to think about forest land management and ecological processes" with the summarizing 'Our Task' section stating that "thinning on a large scale will require commitment and innovation" which is not specific to the Flint Foothills Project.*
4	**Keene, Roy "Logging does not prevent wildfires" Guest Viewpoint, the *Eugene Register Guard* January 11, 2009** "History, not science, refutes the claim that logging helps to prevent forest fires. The forests of the West are far more vulnerable to fire due to a century of industrial logging and fire suppression. Logging has removed most of the older, fire-resistant trees from the forests. Fire suppression has encouraged many smaller and more flammable trees, brush and dense plantations to fill the holes. Logging has set the forests of the West up to burn big and hot. More logging will not fix this." http://www.highbeam.com/doc/1G1-192070397.html **Review: Not Relevant to the Project**

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	This is an opinion piece not a peer reviewed research paper. Flint Foothills does not propose using logging to prevent forest fires.
1	**Keane, R. E. Arno, S. F. 1993. Rapid decline of whitebark pine in western Montana: Evidence from 20-year remeasurements. W. Jour. Of Applied Forestry 8(2):44-47.** "White pine blister rust, an introduced disease, has caused rapid mortality of whitebark pine over the last 30 to 60 years. Keane and Arno (1993) reported that 42 percent of whitebark pine in western Montana had died in the previous 20 years with 89 percent of remaining trees being infected with blister rust." www.wilderness.net/library/documents **Review: Relevant to the Project** *This paper documents a summary of findings on rate of whitebark pine decline, based on remeasured inventory plots in 1991 and 1992 that were initially established in 1971. The quote provided above concerning the effects of white pine blister rust to whitebark pine is relevant to the project and discussed in the Vegetation analysis.*
1	**Keane R.E., Veblen T, Ryan KC, Logan J, Allen C, Hawkes B. 2002. *The cascading effects of fire exclusion in the Rocky Mountains*. In 'Rocky Mountain Futures: an Ecological Perspective'. (Ed. JS Baron) pp. 133– 153. (Island Press: Washington, DC)** "Not all ecosystems or all Rocky Mountain landscapes have experienced the impacts of fire exclusion. In some wilderness areas, where in recent decades natural fires have been allowed to burn, there have not been major shifts in vegetation composition and structure (Keane et al. 2002). In some alpine ecosystems, fire was never an important ecological factor. In some upper subalpine ecosystems, fires were important, but their rate of occurrence was too low to have been significantly altered by the relatively short period of fire suppression (Keane et al. 2002)." http://scholar.google.com/scholar?q=Keane+et+al.+2002+fire&hl=en&as_sdt=0&as_vis=1&oi=scholart **Review: Relevant to the Project** *The link is to a limited, pages omitted section of a larger book. The relevance of natural fires and their effects on ecosystems, along with the impacts of fire exclusion (depending on Fire Groups, wherein at some elevations fire disturbances are within natural frequencies) has been discussed in the project analysis.*
4	**Keppeler, Elizabeth T. Robert R. Ziemer Ph.D., and Peter H. Cafferata. "Effects of Human-Induced Changes on Hydrologic Systems." An American Water Resources Association publication, June 1994.** "Timber harvesting operations affect hydrologic processes by reducing canopy interception and evapotranspiration. Many studies have documented changes in soil properties following tractor yarding (Stone, 1977; Cafferata, l983), and low-ground-pressure skidding (Sidle and Drlica, 1981). More recently, researchers have evaluated cable yarding (Miller and Sirois, 1986; Purser and Cundy, 1992). In general, these studies report decreased hydraulic conductivity and increased bulk density in forest soils after harvest." http://www.fs.fed.us/psw/publications/ziemer/Ziemer94a.PDF

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	Review: Relevant to the Project *This peer-reviewed article is about hillslope hydrological processes in Northern California resulting after timber harvest. The effects observed in this article regarding changes in hillslope hydrology that may occur with this project. Local changes in hillslope hydrology are not specifically addressed in the hydrology report for this project, as the effects are not expected to be measurable. However, the cumulative harvest percentages were calculated and an effort was made to evaluate changes in water yield that might be expected after harvest. See the hydrology report.*
4	**Klein, Al. 2004. "Logging Effects on Amphibian Larvae Populations in Ottawa National Forest"** "Among these four species of amphibians, the spotted salamander is most likely to be affected adversely by the logging as this species of salamander relies on dense forests with full canopies (Harding, 1997)." "Looking at the study on a larger scale, the potential for changes caused by logging is great. Absence of trees could influence water temperature by altering available sunlight, conductivity by changing the amount of organic matter that collects in the vernal ponds, or pH if the logging process deposits foreign residues to the area. Also heavy equipment used to harvest the timber has the potential to alter the terrain." "Modifications to the landscape could change how water flows and collects at the surface and change the size, shape, and location of the vernal ponds. Loss or alteration to small temporary water sources less than four hectares can be extremely detrimental to amphibians water (Semlitsch, 2000). Without vernal ponds amphibians would have difficulty inhabiting forested areas because they rely on the ponds as breeding grounds. If logging disturbs the ponds, amphibian populations could diminish in the areas that surround these vernal pools." http://www.nd.edu/~underc/east/education/documents/AKlein2004Pre-loggingsurveyofamphibianlarvaeinvernalpools.pdf **Review: Not Relevant to the Project** *This study compare species richness and density of amphibians in vernal ponds on the Ottawa National Forest in Michigan, before and after logging, to determine if harvesting affects amphibian populations. This paper does not provide site specific or species specific information relevant to the Flint Foothills project area in Montana. Analysis of effects to amphibian populations and habitat are discussed in the EIS.*
4	**Kulakowski, Dominik Ph.D. Assistant Professor, Clark University. Testimony before the Subcommittee on Public Lands and Forests of the Energy and Natural Resources Committee of the United States Senate April 21, 2010** "Although ongoing outbreaks understandably have led to widespread public concern about increased fire risk, the best available science indicates that outbreaks of mountain pine beetle and spruce beetle do not lead to an increased risk of fire in the vast majority of forests that are currently being affected. We should not let the effects of bark beetle outbreaks, as spectacular as they may be, distract us from the real risk. The real concern in that we have built homes, communities, ski resorts, and other infrastructure in inherently flammable ecosystems. The ongoing outbreaks have not increased the risk of wildfire as much as they have drawn attention to the risk that has been there long before the outbreaks began. Forests of lodgepole pine and spruce-fir are prone to high-severity fires during drought conditions, regardless of the influence of bark beetle outbreaks." (Pg. 5) http://energy.senate.gov/public/_files/KulakowskitestimonyonS2798042110.pdf

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	Review: Not Relevant to the Project The presenter's "goal" of his testimony is to "summarize the best available science on the relationship between beetle outbreaks and fire risk and on associated mitigation efforts." He addresses beetle outbreaks; climate; strategies for reducing fire risk to homes/ 206igantean206s and public safety; and preventing outbreaks. He concludes that outbreaks of mountain pine beetle and spruce beetle do not lead to increased risk of fire in the majority of forests currently affected and that the real concern is the proximity of communities and development in flammable ecosystems. . ; and the risk of fire. The Flint Foothills Project is not a fire hazard mitigation proposal, there are no homes to protect or communities at risk; there is no WUI within the project area.
1	**Lacy, Peter M. 2001. *Our Sedimentation Boxes Runneth Over: Public Lands Soil Law As The Missing Link In Holistic Natural Resource Protection.* Copyright © 2001 Environmental Law; Peter M. Lacy. Originally published at 31 Envtl. L. 433 (2001).** Lacy, 2001 examines the importance of soils for ecosystem functioning and points out the failure of most regulatory mechanisms to adequately address the soils issue. From the Abstract: http://maps.wildrockies.org/ecosystem_defense/Science_Documents/Lacy_2001.pdf **Review: Relevant to the Project** *The discussion by Lacy in which he "examines the gap with respect to soil conservation and protection in current federal public land and resources law," is relevant to the Flint Foothills project. While Lacy provides a discussion on the history of public lands soil law and associated flaws, he does state, "Of all public natural resource laws, the National Forest Management Act (NFMA) provides by far the greatest protection to the soil resource." Lacy also acknowledges that the Forest Service has developed "somewhat extensive internal standards in its Forest Service Manual (FSM) and Forest Service Handbook (FSH)."* *National Forest Management Act (NFMA) of 1976 requires that the Forest Service (FS) manage National Forest System lands without substantial and permanent impairment of land productivity and to maintain or improve soil quality. To assure compliance with the NFMA requirement, the FS established Regional Soil Quality Standards. In Region 1 the SQS were most recently revised in 1999.* *Soil productivity is defined in FSM 2500, Chapter 2550-Soil Management (Forest Service Manual, National Headquarters (WO), Washington DC, 2010) as "the inherent capacity of the soil resource to support appropriate site-specific biological resource management objectives, which includes the growth of specified plants, plant communities, or a sequence of plant communities to support multiple land uses." Because soil productivity is not easily measured (Powers and others 1998; Powers 2002), direct measurement of soil productivity is rarely used, even in research. Rather, surrogates of soil productivity are measured. The Northern Region uses soil disturbance as the surrogate for potential effects to soil productivity and has established thresholds for allowable disturbance. According to Powers (1998) the goal is to define the functional elements of soil that sustain productivity and to identify soil quality indicators of these functions. He further describes the attributes of useful indicators. The indicators that the Northern Region has selected are intended to provide an assessment of potential management effects on the soil functions, which work in combination to produce biomass (productivity). Soil productivity is not a stand-alone soil function. Several soil functions contribute to soil*

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	productivity. Although one or more soil functions may be affected by previous or proposed activities, soil productivity may or may not be maintained.
4	**Laverty, Lyle, USDA Forest Service and Tim Hartzell, U.S. Department of the Interior. "A Report to the President in Response to the Wildfires of 2000", September 8, 2000.** "The Congressional Research Service (CRS) recently addressed the effect of logging on wildfires in an August 2000 report and found that the current wave of forest fires is not related to a decline in timber harvest on Federal lands. From a quantitative perspective, the CRS study indicates a very weak relationship between acres logged and the extent and severity of forest fires. To the contrary, in the most recent period (1980 through 1999) the data indicate that fewer acres burned in areas where logging activity was limited." "Qualitative analysis by CRS supports the same conclusion. The CRS stated: "[T]imber harvesting removes the relatively large diameter wood that can be converted into wood products, but leaves behind the small material, especially twigs and needles. The concentration of these fine fuels on the forest floor increases the rate of spread of wildfires." Similarly, the National Research Council found that logging and clearcutting can cause rapid regeneration of shrubs and trees that can create highly flammable fuel conditions within a few years of cutting." http://www.fs.fed.us/emc/hfi/president.pdf **Review: Not Relevant to the Project** *This is a report that summarizes a Congressional Research Service study of the effects of logging on wildfire risk. The report recommends how best to respond to the year 2000 wildfires fires, reduce the impacts of these wildland fires on rural communities, and ensure sufficient firefighting resources in the future. It contains no sources, references, or literature cited and is not scientific, peer-reviewed literature. The report goes on to further clarify that without adequate treatment of small woody material, logging may exacerbate fire risk rather than lowering it. The purpose and need for the Flint Foothills Project does not include an objective for hazardous fuels reduction. Slash created through the proposed harvest activities would be whole tree yarded at central landing sites for disposal. The concern over the removal of large merchantable trees bears little relevance to the Flint Foothills project because the proposed thinning is from below and would concentrate on removing dead trees.*
4	**Lawren, Bill 1992 "Singing the Blues for Songbirds: Bird lovers lament as experts ponder the decline of dozens of forest species" National Wildlife** "Forest fragmentation, as scientists call the intentional felling of woodland, is actually two processes. In populated areas such as the Atlantic seaboard, it means reduction in the size of forest tracts, usually due to suburbanization and development. In less inhabited areas–northern New England, for example–forest fragmentation refers to isolation of one patch of forest from another by logging, or by the building of roads or power lines." http://www.nwf.org/News-and-Magazines/National-Wildlife/Birds/Archives/1992/Singing-the-Blues-for-Songbirds.aspx **Review: Not Relevant to the Project** *This article discusses fragmentation and birds on the east coast. Forest types, historic and current vegetation trends, development and bird species all vary dramatically from the Flint Foothills project area.*

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4	**Lawrence, Nathaniel, NRDC senior attorney "Gridlock on the National Forests" Testimony before the U.S. House of Representatives Subcommittee on Forests and Forest Health (Committee on Resources) December 4, 2001.** "I will turn first to forest thinning aimed at reducing fire risks. There is surprisingly little scientific information about how thinning actually affects overall fire risk in national forests." "How can it be that thinning could increase fire risks? First, thinning lets in sunlight and wind, both of which dry out the forest interior and increase flammability. Second, the most flammable material – brush, limbs, twigs, needles, and saplings – is difficult to remove and often left behind. Third, opening up forests promotes brushy, flammable undergrowth. Fourth, logging equipment compacts soil so that water runs off instead of filtering in to keep soils moist and trees healthy. Fifth, thinning introduces diseases and pests, wounds the trees left behind, and generally disrupts natural processes, including some that regulate forest health, all the more so if road construction is involved." http://www.nrdc.org/land/forests/tnl1201.asp **Review: Not Relevant to the Project** *The testimony is over the proposed Healthy Forests Initiative in which hazardous fuel reductions activities could be categorically excluded from documentation in an EA or EIS in order to ensure more timely decisions. The presenter does not believe that thinning is a proven silvicultural practice for fuels reduction, and hence, project proposing to use thinning to reduce should not be allowed to be categoricaly excluded from documentation. The purpose and need for the Flint Foothills Project does not include an objective to reduce hazardous fuels; and the analysis is being documented in an EIS. A number of studies and reports have been made over the years investigating the effect of thinning on fire behavior and effects. A list of empirical studies, case studies, and discussion papers is available in the project file that support the use of tree thinning to modify fire behavior and effects.*
4	**Leitner, Brian. "Logging Companies are Responsible for the California Wildfires." The Democratic Underground, October 30, 2003.** "Those who would argue that this form of logging has any positive effects on an ecosystem are clearly misinformed. This type of logging has side effects related to wildfires, first and foremost being that the lumber companies aren't interested in hauling out all the smaller trees, branches, leaves, pine needles, sawdust, and other debris generated by cutting all these trees. All this debris is left on site, quickly dries out, and is far more flammable sitting dead on the ground than it was living in the trees. Smaller, non-commercially viable trees are left behind (dead) as well – creating even more highly flammable fuel on the ground. http://www.democraticunderground.com/articles/03/10/30_logging.html **Review: Not Relevant to the Project** *The "form of logging" that the author is referring to is both clearcutting and thinning. He defines thinning as "essentially, taking the largest, healthiest, and most fire-resistant trees they can find and leaving the smaller, more flammable trees behind" (Leitner 2003). The quotation is opinion and irrelevant to the Flint Foothills project because it addresses activities that we are not proposing to do. At the top of the article, there are two pictures side-by-side with the title of the article superimposed over the pictures. The picture on the left is of a large, recently-cut, clearcut from which*

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	the logs have not even been removed yet from an unknown location The picture on the right is the popular picture taken in 2000 on the Bitterroot NF outside of Sula, Montana, showing two Elk standing in the middle of the river while the partially timbered hillside burns intensely in the background. The Flint Foothills project proposes to salvage by cleracut dead and dying 209igantean pine and thin Douglas-fir and ponderosa pine from below. This is an opinion piece not a peer reviewed research paper.
4	**Logan, Jesse A. Ph.D. and James A. Powell Ph.D. "Ghost Forests, Global Warming and the Mountain Pine Beetle (*Coleoptera*: *Scolytidae*)" AMERICAN ENTOMOLOGIST • Fall 2001 http://www.usu.edu/beetle/documents/Logan_Powell01.pdf** "The mountain pine beetle is a native insect, having co-evolved as an important ecological component of western pine forests. The inter-relationship between beetle-caused mortality and subsequent fire has resulted in a basic ecological cycle for many western forests (Schmidt 1988). Some pines species, such as lodgepole pine, are maintained by periodic disturbances. The lodgepole pine forest-type1 typically is an essential monoculture of even-aged trees that were initiated by a catastrophic, stand-replacing fire. Without the influence of fire (Fig. 1B), lodgepole pine would be lost over much of its native range (Brown 1975, Lotan et al. 1985). Fire serves to prepare the seedbed, releases seeds from the serotinous cones (triggered to release seeds by heat of a fire), and eliminates more shade-tolerant species such as spruce or fir that would eventually out-compete and replace the early seral lodgepole pine." **Review: Relevant to the Project** *The above quote from the article does apply to the project, and the information provided is similar to what is in the Vegetation report for the analysis. However, the linked article is actually about MPB effects in whitebark pine, which is also relevant to the project, and is already part of the Vegetation report for the analysis.*
4	**Long, Richard D., U.S. Department of Agriculture Office of Inspector General "Western Region Audit Report: Forest Service National Fire Plan Implementation" Report No. 08601-26-SF, November 2001.** "We concluded that commercial timber sales do not meet the criteria for forest restoration." http://maps.wildrockies.org/ecosystem_defense/Resources_Species_Topics/Fire/Misuse%20of%20Fire%20Plan%20funds.pdf **Review: Not Relevant to the Project** *The OIG report referenced was an audit of the National Fire Plan (NFP) allocated dollar expenditures. The quote provided above was a reference to a NFP planning dollars expended for a commercial timber sale. The Flint Foothills Project is not a National Fire Plan project.*
4	**Lowe, Kimberly Ph.D. "Restoring Forest Roads." A Northern Arizona University Ecological Restoration Institute publication. Working Paper 12. June, 2005.** "The compaction of forest road soils is known to reduce aeration, porosity, infiltration rates, water movement, and biological activity in soils. Research indicates that soil bulk density, organic matter, moisture, and litter depths are much lower on roads than on nearby forest lands. Macropores, which provide soil drainage and infiltration, have been shown to significantly decrease in size as a result of road construction and use. Reduced infiltration and increased compaction promote soil erosion, especially during the seasonal southwestern monsoon rains (Elseroad 2001)."

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	“Physical disturbances caused by road construction and vehicle use create ideal conditions for colonization by invasive exotic plant species. The use of roads by vehicles, machinery, or humans often aids the spread of exotic plant seeds. Once established, they can have long-term impacts on surrounding ecosystems and can be difficult to remove.” “Roads are known to cause habitat fragmentation. Many create ecological ‘edges’ with different plant species, light levels, and hiding cover, all of which may alter animal survival, reproductive success, and movement patterns. The introduction of exotic plants can disrupt the availability of native vegetation used by wildlife for food and shelter (Trombulak and Frissell 1999).” “Forest roads often develop a water-repellent soil layer caused by lack of vegetative cover and changes in soil composition. This can substantially influence how runoff is processed. Erosion, the formation of water channels beside the road, and increased sediment loads in nearby streams are common results of this process (Baker 2003).” “Because they provide easier access to many forest tracts, forest roads often allow more human-caused fires to be ignited.” http://library.eri.nau.edu/gsdl/collect/erilibra/index/assoc/HASH0e8e.dir/doc.pdf **Review: Relevant to the Project** *This publication presents an overview of the problems associated with forest roads and a guide to traditional and novel methods to restore them. It is agreed that roads are a vector for invasive species expansion. However our records indicate that we do not have a significant human-caused fire problem on the Pintler District.* *Temporary roads are one of the issues associated with soil productivity and quality included in the evaluation of the proposed action The publication briefly discusses ecological impacts due to forest roads and methods of restoration. The discussion is very general and the concepts can reasonably be applied to the project area.* *This working paper describes the methods and effects of restoring forest roads. The DEIS addresses the effects of roads on habitat for several wildlife species, mostly pertaining to road densities and secure areas.* *This Research note describes many of the effects of forest roads including sedimentation in a summer monsoon climate in Arizona. Recommendations for restoration of roads may lead to significant benefits, such as reduced soil erosion, or reduced hydrologic changes and improved slope stability. This article points out the benefits of restoring roads. Some roads proposed for construction in this project (4.4 miles) under alternative 2 will be obliterated after the project.*
4	**Luce, Charles H. Ph.D., 2002. “Hydrological processes and pathways affected by forest roads: what do we still need to learn?” Hydrologic Processes: 16, 2901–2904.** “Almost everywhere people live and work they build and use unimproved roads, and wherever the roads go, a range of environmental issues follows.” “Among the environmental effects of unimproved roads, those on water quality and aquatic ecology are some of the most critical. Increased chronic sedimentation, in particular, can dramatically change the food web in affected streams and lakes.” “The nearly impervious nature of road surfaces (or treads) makes them unique within forested environments and causes runoff generation even in

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	mild rainfall events, leading to chronic fine sediment contributions." "If we look at the issue of what we need to learn or the research priorities for forest road hydrology, I would argue that the areas of cutslope hydrology and effectiveness of restoration efforts are perhaps most critical." "At a few sites in the mountains of Idaho and Oregon a substantial portion of the road runoff (80–95%) came from subsurface flow intercepted by the cutslope (Burroughs et al., 1972; Megahan, 1972; Wemple, 1998)." http://onlinelibrary.wiley.com/doi/10.1002/hyp.5061/abstract **Review: Relevant to the Project** *This invited commentary published in a journal looks at some of the effects of roads on hydrology, turbidity and sedimentation. It suggests new research should focus of road cutslope hydrology and restoration techniques. Chronic sedimentation from roads is very damaging to species food webs. Efforts have been made to model before project and after project sediment delivery to streams from roads, and results are shown in the project hydrology report and the DEIS. BMPs will be used in this project that are designed to significantly reduce sedimentation from project area roads.*
4	**Luce, Charles H. Ph.D., and Beverley C. Wemple Ph.D. "Introduction to Special Issue on Hydrologic and Geomorphic Effects of Forest Roads" Earth Surface Processes and Landforms 26,111-113 (2001)** "Roads have been a part of human landscapes for more than 40 centuries. During the 20th century, technological advances have increased our ability to construct new roads at unprecedented rates and into steeper terrain. In the last half of that century, an extensive network of roads has been constructed in forests and other wildlands to facilitate use and management of natural resources. They are the transportation system that allows transport of timber and minerals from forests and access for recreationists, land managers, firefighters, and residents of villages or vacation homes." http://www.fs.fed.us/rm/pubs_other/rmrs_2001_luce_c001.pdf **Review: Relevant to the Project** *This peer-reviewed journal chapter introduction is a general discussion of some of the effects of roads world-wide on hydrology, turbidity and sedimentation. The effects of existing roads in the project area, and the expected effects of project area roads during the project are discussed in the EIS and in the project hydrology report. BMPs will be used on roads used for this project that are demonstrated to be effective at reducing sediment derived from roads, and reducing the amount of connectedness between roads and streams.*
1	**Mahalovich et al. 2006. "Whitebark Pine Germination, Rust Resistance, and Cold Hardiness Among Seed Sources in the Inland Northwest: Planting Strategies for Restoration." In: Riley, L. E.; Dumroese, R. K.; Landis, T. D., tech. 211igan. 2006. National Proceedings: Forest and Conservation Nursery Associations—2005. Proc. RMRS-P-43. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 160 p. Available at: http://www.rngr.net/nurseries/publications/proceedings**

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	"Since, 2005, rust resistant seed sources have been identified in the Northern Rockies (Mahalovich et al 2006)." http://www.fs.fed.us/rm/pubs/rmrs_p043/rmrs_p043_091_101.pdf **Review: Not Relevant to the Project** *The Flint Foothills proposal does not plan to plant whitebark pine.*
4	**Maholland, Becky and Thomas F. Bullard Ph.D., "Sediment-Related Road Effects on Stream Channel Networks in an Eastern Sierra Nevada Watershed." Journal of the Nevada Water Resources Association, Volume 2, Number 2, Fall 2005.** "Roads in the watershed contribute to sediment production by concentrating runoff, thereby increasing sediment load to the stream network. Most unimproved (dirt) roads connect either directly or indirectly with streams and, therefore, act as extensions of stream networks by effectively increasing watershed drainage density and subsequently sediment loads to streams. In the South Fork subwatershed of Squaw Creek, road connectivity has resulted in an increase in effective drainage density of approximately 250%. Throughout the Squaw Creek watershed, it is estimated that dirt roads potentially contribute as much as 7,793 metric tons/year to the watershed sediment budget." http://www.nvwra.org/docs/journal/vol_2_no_2/NWRAjournal_fall2005_article4.pdf **Review: Relevant to the Project** *This peer-reviewed journal article looks at some of the effects of roads on hydrology, turbidity and sedimentation. It was found that roads in a northern California watershed contributed to sediment production by concentrating runoff, thereby increasing sediment load to the stream network. Most unimproved (dirt) roads connected either directly or indirectly with streams and, therefore, acted as extensions of stream networks by effectively increasing watershed drainage density and subsequently sediment loads to streams.* *This effect will be reduced for the project because BMPs will be used on roads used for this project that are demonstrated to be effective at reducing sediment derived from roads, and reducing the amount of connectedness between roads and streams. An attempt to evaluate road runoff and sedimentation at stream crossings was completed and is disclosed in the project hydrology report and the DEIS.*
4	**Malecki, Ron W. "A New Way to Look at Forest Roads: the Road Hydrologic Impact Rating System (RHIR)" The Road-RIPorter, Autumn Equinox, 2006** "One of the greatest impacts of roads and (especially motorized) trails is their effect on the hydrology of natural landscapes, including the flow of surface and ground water and nutrients. These hydrologic effects are responsible for changes to geomorphic processes and sediment loads in roaded areas (Luce and Wemple 2001)." (pg. 12) http://www.wildlandscpr.org/files/uploads/RIPorter/rr_v11-3.pdf **Review: Not Relevant to the Project** *This non-peer reviewed article is not relevant to the project because road restoration is not the focus of this project. It looks at some of the effects of*

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	roads and promotes road restoration, and addresses the economics of restoration.
4	**MamasHealth.com. "Rotting Wood and how it affects the Environment"** http://www.mamashealth.com/saveearth "Rotting logs are a very common feature of wild ecosystems. Rotting logs recycles nutrients back into the soil and provides a healthy habitat for a wide range of insects, plants, and animals. Rotting log provides homes for small mammals, insects, worms, and spiders. The rich, organic soil provides a unique habitat for fungi, tree seedlings, wildflowers, mosses, and ferns." **Review: Not Relevant to the Project** *The excerpt above is from a short web posting that is not backed by peer reviewed literature. The importance of coarse woody debris recruitment is recognized and provided for by recommendations in the R1 supplement to FSM 2550 based on Graham et al. 1994. Coarse woody debris data ranges from 1 to 17 tons/acre in the proposed harvest activity areas. The soil quality standards (Graham and others 1994) recommend leaving 7-25 tons/acre.*
4	**Mann, Charles C. Ph.D. and Mark L. Plummer Ph.D. "Call for 'Sustainability' in Forests Sparks a Fire" Science 26 March 1999: Vol. 283. No. 5410, pp. 1996 – 1998.** "In hopes of ending conflicts over "multiple use," an independent scientific committee has proposed that "ecological sustainability" should become the principal goal in managing the U.S. national forests and grasslands, which since 1960 have been under a congressional mandate to serve industry, recreation, and conservation all at once." http://www.sciencemag.org/cgi/content/summary/283/5410/1996 **Review: Relevant or Not Relevant to the Project** *This article summarized the process (as of 1999) that a committee of scientists went through to prepare a report with recommendations to the Forest Service for updating the National Forest Management Act by incorporating them into upcoming draft regulations not specific to the Flint Foothills Project. The Forest Service will continue to follow all laws as mandated, including the Multiple Use Sustained Yield Act and the National Forest Management Act.*
1	**Marcot, B. G., and D. D. Murphy. In press. "Population viability analysis and management. " In: Szaro, R., ed. Biodiversity in Managed Landscapes: Theory and Practice. Proceedings of a conference 13-17 July 1992, Sacramento CA. Oxford University Press.** "The cumulative effects of carrying out multiple projects simultaneously across the BDNF makes it imperative that population viability be assessed at least at the forestwide scale (Marcot and Murphy, 1992)." http://www.landsinfo.org/ecosystem_defense/Science_Documents/Marcot_Murphy_1992.pdf **Review: Relevant to the Project** *During Forest Plan revision, species were reviewed for inclusion in the viability analysis. All species determined to be "at-risk" were included. The*

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	viability analysis found that based on Forest Plan management direction, conservation of individual species at the Forest and project level was achieved. Forest Plan management direction has been incorporated into this project. The analysis area used is disclosed in the analysis and varies by species. This project also includes an analysis of forest-associated "at-risk" species and is discussed in the wildlife analysis.
1	**Marcot, B. G., and D. D. Murphy. In press. "Population viability analysis and management. " In: Szaro, R., ed. Biodiversity in Managed Landscapes: Theory and Practice. Proceedings of a conference 13-17 July 1992, Sacramento CA. Oxford University Press.** **Lacey R. C. and T. W. Clark. 1993. Simulation Modeling Of American Marten (*Martes Americana*). In: *Great Basin Naturalist* 53(3), pp. 282-292.** "It is also of paramount importance to monitor population during the implementation of the Forest Plan in order to validate assumptions used about long-term species persistence i.e., population viability (Marcot and Murphy, 1992; Lacy and Clark, 1993)." https://ojs.lib.byu.edu/ojs/index.php/wnan/article/viewArticle/1367 **Review: Relevant to the Project** *During Forest Plan revision, species were reviewed for inclusion in the viability analysis. All species determined to be "at-risk" were included. The viability analysis found that based on Forest Plan management direction, conservation of individual species at the Forest and project level was achieved. Past project information and monitoring information has been incorporated into resource reports and summarized in the DEIS. Past project and monitoring information is on file at the Beaverhead-Deerlodge National Forest. The Lacey and Clark paper addresses a population model called VORTEX that they developed as a management tool to estimate extinction probabilities for American marten populations. The marten may be a management indicator species in some locations, though it is not on the Beaverhead-Deerlodge NF.*
4	**Mark, Jason "Mission Impossible" Earth Island Journal, winter 2009.** "For Pyne and many others who study wildfires, the conventional understanding of firefighting has led us to the misguided conclusion that this is a struggle we can win. In much of the West, fire is an ordinary part of the landscape, a feature as essential to many ecosystems as rivers and grasses. Periodic fires are nothing more than regular disturbances; it is us who have made them into disasters." http://www.earthisland.org/journal/index.php/eij/article/mission_impossible/ **Review: Not Relevant to the Project** *This is an opinion piece not a peer reviewed scientific paper, and the commenter does not relate it to the Flint Foothills Project.*
4	**Marks, Raissa. Fish and Wildlife Habitat Management Leaflet number 37. Published by the Natural Resources Conservation Service, USDA, April 2006.** "Fire releases nutrients and uncovers bare soil. The blackened, bare soil warms quickly, which stimulates soil microbial activity, nutrient cycling, and plant growth. In forests, fire opens up part of the canopy to sunlight, which allows sun-loving plant species to recolonize the site." "Following fires, plant communities go through successional changes. Many native wildlife species and popular game species, such as bobwhite

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	quail, white-tailed deer, and wild turkey, are dependent on periodic fire to create and maintain suitable habitat. Surface fires can stimulate the growth of herbaceous foods for deer, elk, moose, and hares, and can enhance berry production for black bears and other wildlife. Small mammal populations generally increase in response to new vegetation growth, providing a food source for carnivores. Fire can also reduce internal and external parasites on wildlife." (pg. 2) "Natural disturbance such as fires, floods, and herbivory are critical in maintaining valuable ecosystem functions and creating and restoring wildlife habitat." (pg. 7) http://www.sc.nrcs.usda.gov/intranet/Dick%20Yetter%20Information/Technotes%2010-06/ImportofDisturbInHabMgt.pdf **Review: Not Relevant to the Project** *This is a leaflet provided for private landowners explaining the ecological processes associated with natural disturbances. The paper also discusses potential treatment methods to mimic natural disturbances. The paper presents concepts in general terms that apply to ecological systems, but without specific reference to peer-reviewed science, this paper would not be applicable to analysis for effects to individual species addressed in the Flint Foothills Project.*
4	**Martin, Rachel Ph.D. and 221 other Ph.D. Scientists. From an April 16, 2002 letter to President George W. Bush.** "As conservation-minded scientists with many years of experience in biological sciences and ecology, we are writing to bring your attention to the need to protect our National Forests. Logging our National Forests has not only degraded increasingly rare and valuable habitat, but also numerous other services such as recreation and clean water." "Our National Forest System was first established over one hundred years ago to bring an end to the reckless destruction that had ravaged wildlife habitat and watersheds. At the time, Congress acknowledged that establishing National Forests would provide America with diverse wildlife, healthy watersheds, and a sustainable supply of wood products." "Unfortunately, the past emphasis of management has been on logging and the original vision for our National Forests has failed to be fully realized. During the past several decades, our National Forests have suffered from intense commercial logging. Today almost all of our old growth forests are gone and the timber industry has turned our National Forests into a patchwork of clearcuts, logging roads, and devastated habitat. More than 3,000 species of fish and wildlife and 10,000 plant species–including 230 endangered plant and animal species–make their home in National Forests. Scientific research has repeatedly reaffirmed the tenet that wildlife need an abundant, healthy, and intact environment to survive. Unless the destruction of fragile ecosystems is immediately reversed through scientifically based restoration and recovery, the damage done to terrestrial and aquatic habitat will be irrevocable." http://www.pabiodiversity.org/listserve/03-13-03.pdf **Review: Not Relevant to the Project** *This letter was written to then President Bush to urge him to end commercial logging on NFS lands. Commercial logging is still permitted on NFS lands. Forest Plan direction guides management of the Forest. The BDNF Forest Plan considered the effects of management practices on "at risk"*

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	species (found in the Biological Evaluation (Appendix B) for the FEIS for the Forest Plan and the Biological Assessment for wolves and grizzlies). Under review of an appeal, it was found that the Forest Plan achieved conservation of individual species at the project level.
4	**Martinez, Lori. "Applications of Tree-Ring Dating" Laboratory of Tree-Ring Research at the University of Arizona. February, 2000.** "During recent decades, ecologists have learned that forest fires were a pervasive phenomenon in practically all forests of the world, even the rainforests. Humans have severely disrupted the natural pattern of fire across the landscape, especially during the last 100 years. Therefore, if forests are to be returned to their more 'natural' state, fire will have to be reintroduced." http://www.ltrr.arizona.edu/lorim/apps.html **Review: Not Relevant to the Project** *The Flint Foothills Project is not proposing reintroducing fire to return to a more "natural" state; but we agree with the statement.*
4	**Maser, C. Ph.D., and J. M. Trappe Ph.D. "The Seen and Unseen World of the Fallen Tree", 1984 USDA Forest Service, GTR-PNW-164** "Logging removes a mass that harbor a myriad of organisms, from bacteria and actinomycetes to higher fungi. The smaller organisms, not visible to the unaided eye, are still important components of the system." http://www.fs.fed.us/pnw/publications/pnw_gtr164/ **Review: Relevant to the Project** *This paper is relevant to the Flint Foothills project in that reduction in site nutrient capital due to the removal of woody material is one of the issues associated with soil productivity and quality included in the evaluation of the proposed action (Soils section). Maser and Trappe (1984) synthesize "available data on fallen trees in unmanaged old-growth forests" in order to bring awareness to and address research needs in the area of short-term and long-term biological consequences of removing woody debris from streams or forests. The quote above is inaccurate. The section of the paper from which the above was extrapolated and misquoted is referring to characteristics of fallen trees. "Fallen trees harbor a myriad of organisms, from bacteria to actinomycetes or higher fungi. Of these, only some of the fungi might be noticed by the casual observer as mushrooms or bracket fungi. These structures, however, are merely the fruiting bodies produced by mold colonies within the log. Many fungi fruit within the fallen tree, so they are seen only when the tree is torn apart. Even when a fallen tree is torn apart, only a fraction of the fungi present are noticed because the fruiting bodies of most appear only for a small portion of the year. The smaller organisms, not visible to the unaided eye, are still important components of the system" (p. 16, emphasis added). We acknowledge that coarse woody debris (CWD) plays an important role in soil productivity and quality. CWD is one soil quality indicator which influences soil hydrology, biology, nutrient cycling, and soil stability and support functions which are indicators of soil productivity (USDA Forest Service, 2010). The removal of woody material from the site is common due to whole tree harvesting practices. The R1 supplement to FSM 2550 recommends following the guidelines set forth in Graham et al. 1994 in determining the amount of coarse woody debris to be left onsite. By following prescribed project design features (page xx of the DEIS) the appropriate amount of CWD would be left on site in turn providing habitat for the smaller unseen organisms.*

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4	**Maser, C. Ph.D., R. F. Tarrant, J. M. Trappe Ph.D., and J. F. Franklin Ph.D. 1988. "The Forest to the Sea: A Story of Fallen Trees" USDA Forest Service, GTR-PNW-GTR-229** "Logging removes mature and maturing trees which conserve essential elements, whereas the area containing new very young planted trees following logging are susceptible to erosion and essential element loss." (pg.5) "Logging removes tree parts that would have created and maintained diversity in forest communities." (pg. 44) http://www.fs.fed.us/pnw/publications/pnw_gtr229/ **Review: Relevant to the Project** *This paper is relevant to the Flint Foothills project in that reduction in site nutrient capital due to the removal of woody material is one of the issues associated with soil productivity and quality included in the evaluation of the proposed action (Soils section). Most of the information is specific to coastal Oregon and while the ecosystem is completely different from that of the Flint Foothills project area, the concepts can be reasonably applied to the project area. Maser et al. (1988) document the importance of large, dead woody debris in long term forest productivity. The quotes above are inaccurate. The section of the paper from which the first 'quote' was extrapolated is referring to characteristics of a coastal Oregon forest. "The forest's character changes with succession. Net primary productivity is greater in young forests than in old ones. Old forests conserve nutrients, whereas very young forests are susceptible to erosion and nutrient loss (Franklin and others 1981)" (p. 5, emphasis added). The section of the paper from which the second 'quote' was extrapolated is referring to the benefits of fallen trees. "Decaying, fallen trees contribute to long-term accumulation of soil organic matter, partly because the carbon constituents of well-decayed wood are 80-90 percent residual lignin and humus (Means and others 1985). Decaying wood in the soil and establishment of conifer seedlings and mycorrihizal fungi on dry sites are positively correlated (Harvey and others 1987). Fallen trees also create and maintain diversity in forest communities" (p. 44, emphasis added). We acknowledge that coarse woody debris (CWD) plays an important role in soil productivity and quality. CWD is one soil quality indicator which influences soil hydrology, biology, nutrient cycling, and soil stability and support functions which are indicators of soil productivity (USDA Forest Service, 2010). The removal of woody material from the site is common due to whole tree harvesting practices. The R1 supplement to FSM 2550 recommends following the guidelines set forth in Graham et al. 1994 in determining the amount of coarse woody debris to be left onsite. By following prescribed project design features the appropriate amount of CWD would be left on site.*
1	**McArthur, E. 1990. "Introduction: cheatgrass invasion and shrub die-off." Pages 1-2 in Proceedings – Symposium on cheatgrass invasion, shrub die-off and other aspects of shrub biology and management. USDA Forest Service. Intermountain Research Station. General Technical Report INT-276.** As related to letter 1, comment 35; additional literature to address **Review: Not Relevant to the Project** *The document could not be located on the internet. However, other articles that referenced this symposium document focused on shrublands such as the vast sagebrush communities of Southern Idaho, Eastern Oregon and Nevada. These sites within the Great Basin have drastically been*

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	influenced by cheatgrass and fire. The Flint Foothills project area has a very small cheatgrass and sage brush component. These sites are not located within any proposed units.
4	**McCashion, J. D. and R. M. Rice Ph.D. 1983. "Erosion on logging roads in northwestern California: How much is avoidable?" Journal of Forestry 8(1): 23-26.** "A study was made on 344 miles of logging roads in northwestern California to assess sources of erosion and the extent to which road-related erosion is avoidable. At most, about 24 percent of the erosion measured on the logging roads could have been prevented by conventional engineering methods. The remaining 76 percent was caused by site conditions and choice of alignment. On 30,300 acres of commercial timberland, an estimated 40 percent of the total erosion associated with management of the area was found to have been derived from the road system." http://www.fs.fed.us/psw/rsl/projects/water/McCashion.pdf **Review: Relevant to the Project** *This peer-reviewed journal article looks at some of the effects of roads on hydrology, turbidity and sedimentation in Northern California. The focus of the article is identifying how much erosion can be avoided on forest roads, and the article points out that not all erosion from forest roads is preventable. The study looked at 344 miles of logging roads in northwestern California to assess sources of erosion and the extent to which road-related erosion is avoidable. At most, about 24 percent of the erosion measured on the logging roads could have been prevented by conventional engineering methods.* *For this project, sedimentation from project forest haul roads has been estimated using the WEPP Roads model and results are disclosed in the project hydrology report. BMPs that have been demonstrated to be effective at controlling sediment will be used to minimize sedimentation from project roads. Model results and monitoring have shown that significant reductions in sedimentation would occur from applying BMPs to roads.*
4	**McDaniel, Josh. 2007. "The Zaca Fire: Bridging Fire Science and Management" Widland Fire Lessons Learned** "The experience of the Zaca Fire demonstrates a window of opportunity to improve the link between science and management. A major concern often expressed in both fire research and fire management circles is that there is a lot of science being produced, but very little that can or is being incorporated (depending on your perspective) into fire management. There may be a current opening to change that state of affairs." http://www.wildfirelessons.net/Additional.aspx?Page=110 **Review: Not Relevant to the Project** *This is an opinion and not a peer reviewed scientific paper and the commenter does not address how their statement either supports or is in contrast to our project.*
4	**McFero III, Grace, J. "Sediment Plume Development from Forest Roads: How are they related to Filter Strip Recommendations?" An ASAE/CSAE Meeting Presentation, Paper Number: 045015, August 1-4, 2004.**

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	"Research has shown that roads can have adverse impacts on the water quality on the forest landscape (Authur et al. 1998; Binkley and Brown 1993; Megahan et al. 1991). The forest road system has been identified by previous research as the major source of soil erosion on forestlands (Anderson et. Al 1976; Patric 1976; Swift 1984; Van Lear et al. 1997). Furthermore, roads are cited as the dominant source of sediment that reaches stream channels (Packer 1967; Trimble and Sartz 1957; Haupt 1959)." http://www.srs.fs.usda.gov/pubs/ja/ja_grace017.pdf **Review: Relevant to the Project** *This article looks at some of the effects of roads on turbidity and sedimentation in Alabama and Georgia. This study was undertaken to assess sediment travel distances downslope of forest roads and characterize the factors influencing these distances. Sediment plume lengths were measured at 235 sites downslope from the outlet of road drainage structures. Sites included a range of downslope gradients, road gradients, road section lengths,and flow path conditions. The initial analysis found that drainage spacing was within BMP recommendations for 70 and 90 percent of the plumes evaluated for Alabama and Georgia, respectively. Sediment plume lengths ranged from 3 to 140 meters with a mean of 30 meters. This study is a hard look at effectiveness of BMPs. Major factors influencing sediment plume lengths were slope gradients, and the extent of road maintenance.* *For this project, BMPs that have been demonstrated to be effective at controlling sediment will be used to minimize sedimentation from project roads. Model results and monitoring have shown that significant reductions in sedimentation would occur from road maintenance and applying BMPs to roads.*
4	**McIntosh, B.A., J.R. Sedell, J.E. Smith, R.C. Wissmar, S.E. Clarke, G.H. Reeves, and L.A. Brown. 1994. "Management history of eastside ecosystems: changes in fish habitat over 50 years, 1935-1992." 1994 GTR-321 93-181.** "In addition to the direct effects of habitat loss and fragmentation, logging typically reduces ecosystem health by: a) damaging aquatic habitats through siltation, reduction in stream complexity and increased water temperatures." **This link opens to the PNW Region 6 Research Station Web page and the document is there in Parts A-B.** http://www.fs.fed.us/pnw/publications/pnw_gtr321/ **Review: Not Relevant to the Project** *The study addresses changes in fish habitat over a 50-year time span in four streams in the Columbia River basin in Washington and Oregon. Watersheds with high quality fish habitat or high potential for restoration were identified. This study is not applicable to the streams and fish habitat in the Flint Foothills project area.*
4	**McClellan, Bruce N. "Relationships between Human Industrial Activity and Grizzly Bears" Bears: Their Biology and Management, Vol. 8 International Conference on Bear Research and Management. February 1989 (1990), pp. 57-64** "Road construction in remote areas appears to be the major long term impact of resource extraction industries and the most significant problem

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	facing grizzly bears in most locations. Open roads are an influence in all 5 ways that people affect bears. Vehicles on roads can harass bears, displace them from quality habitats, and cause reduced bear use of altered habitats, such as cutting units. Bears that are displaced from roads may cause social disruption in areas away from roads. Finally, roads permit access for many people and some of these will shoot bears." (Pg. 62) http://www.bearbiology.com/fileadmin/tpl/Downloads/URSUS/Vol_8/McClellan_8.pdf **Review: Relevant to the Project** *Roads (and motorized trails) have been recognized to affect wildlife use (including grizzly bears) in an area. As a result, the Forest Plan includes goals, objectives and standards to provide wildlife secure areas. Analysis of the effects of the project on wildlife secure areas and open motorized road and trail densities is provided in the Flint Foothills Project wildlife analysis. All temporary roads would be obliterated after use and there would be no new permanent roads open to public access under either action alternative.*
1	**Mealey, Stephen P., 1983. Wildlife Resource Planning Assistance to the Payette and Boise National Forests. April 1, 1983. U.S. Forest Service, Land Management Planning Systems, 3825 E. Mulberry, Fort Collins, Colorado 80524.** "The FS has stated: "Well distributed habitat is the amount and location of required habitat which assure that individuals from demes,1 distributed throughout the population's existing range, can interact. Habitat should be located so that genetic exchange among all demes is possible." (Mealey 1983.)" **Review: Not Relevant to the Project** *The citation consists of steps to follow to address Forest-level planning requirements concerning species viability. During the Beaverhead-Deerlodge Forest Plan revision, species were reviewed for inclusion in the viability analysis. All species determined to be "at-risk" were included. The viability analysis found that based on Forest Plan management direction, conservation of individual species at the Forest and project level was achieved.*
4	**Megahan, Walter F. Ph.D. "Predicting Road Surface Erosion from Forest Roads in Washington State" from a presentation presented at the 2003 Geological Society of America meeting.** "Erosion from forest roads can be a large source of sediment in watersheds managed for timber production." http://gsa.confex.com/gsa/2003AM/finalprogram/abstract_67686.htm **Review: Not Relevant to the Project** *This peer-reviewed article is not relevant to the project because it describes a sediment modeling technique used in Washington State that was not used for this project.*

[1]Subpopulations.

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4	**Melle, Ann R. "The U.S. Forest Service Approach to Forest Law Enforcement" A presentation to the East Asia Ministerial Conference, September 12, 2001.** Ms. Melle is the Asst. Director of Law Enforcement and Investigations, USDS[A] Forest Service "The FS manages the National Forest System's natural resources with a commitment to long term ecosystem sustainability, multiple use, local community involvement and economic stability, interaction of social and cultural values with forest resource management, and the use of management practices based on the best science available." http://siteresources.worldbank.org/INTINDONESIA/FLEG/20171799/Anne_Melle.pdf **Review: Not Relevant to the Project** *The focus of the presentation is on the history of the LEI (Law Enforcement and Investigations) and "Sawlog Enforcement Program" (addressing timber theft).The article is not relevant to the Flint Foothills Vegetation Management Project, though we agree that the principles stated in the excerpt are relevant to the project. With respect to "the best science available," the project considers the latest and best science available; over 100 references are cited in the analyses.*
1	**Montana State Noxious Weed List** http://www.weedawareness.org/weed_list.html **Review: Relevant to the Project** *The actual weed list is found at http://agr.mt.gov/agr/Programs/Weeds/PDF/weedList2010.pdf*
1	**Montana Department of Fish, Wildlife and Parks. 1997. Status and distribution of the pygmy rabbit in Montana: final report. Montana Department of Fish, Wildlife and Parks. PO Box 173220, Bozeman, MT.** **http://fwpiis.mt.gov/content/getItem.aspx?id=8220** As related to letter 1, comment 35; additional literature to address **Review: Relevant to the Project** *This survey report documents observed pygmy rabbit locations and delineates the known distribution of the species in western Montana at the time the report was issued. Known occurrences and range delineations in general are utilized in the Flint Foothills wildlife analysis to aid in determining potential project impacts to the species and its habitats.*
4	**Moring, John R. Ph.D. 1975. "The Alsea Watershed Study: Effects of Logging on the Aquatic Resources of Three Headwater Streams of the Alsea River, Oregon – Part III." Fishery Report Number 9 Oregon Department of Fish and Wildlife.** "Logging practices can indirectly result in changes in the biological components of a stream, and can have direct and indirect on the physical

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	environment in streams. The primary environmental changes of concern are the effects of siltation, logging debris, gravel scouring, destruction of developing embryos and alevins, blockage of streamflow, decrease in surface and intragravel dissolved oxygen, increase in maximum and diel water temperatures, changes in pool/riffle ratios and cover, redistribution of fishes, reduction in fish numbers, and reduction in total biomass." http://www.for.gov.bc.ca/hfd/library/ffip/Moring_JR1975b.pdf **Review: Not Relevant to the Project** *This study assesses effects of logging practices on small headwater streams important for spawning and rearing areas for several species of salmon and trout in coastal Oregon.The logging was implemented over a 15-year period, 1959-1973. The Flint Foothills Project in Montana is designed with features and riparian habitat conservation areas that apply parameters to reduce effects.*
4	**Naeem, Shahid Ph.D., F.S. Chapin III Ph.D., Robert Costanza Ph.D., Paul R. Ehrlich Ph.D., Frank B. Golley Ph.D., David U. Hooper Ph.D. J.H. Lawton Ph.D., Robert V. O'Neill Ph.D., Harold A. Mooney Ph.D. Osvaldo E. Sala Ph.D., Amy J. Symstad Ph.D., and David Tilman Ph.D. "Biodiversity and Ecosystem Functioning: Maintaining Natural Life Support Processes." Issues in Ecology No. 4. Fall 1999.** "Biodiversity in managed ecosystems is poor. Less biodiverse communities and ecosystems are more susceptible to adverse weather (such as drought) and exotic invaders, and have greatly reduced rates of biomass production and nutrient cycling." "All of these studies show that ecosystem functioning is decreased as the number of species in a community decreases. Declines in functioning can be particularly acute when the number of species is low, such as in most managed ecosystems including croplands or timber plantations." "Recent evidence demonstrates that both the magnitude and stability of ecosystem functioning are likely to be significantly altered by declines in local diversity, especially when diversity reaches the low levels typical of managed ecosystems." http://www.esa.org/science_resources/issues/TextIssues/issue4.php **Review: Relevant to the Project** *This report provides an overview of ecosystem functioning, reviews the distinction between taxonomic biodiversity and functional diversity, and evaluates the current status of research concerning ecosystem responses to changes in diversity.* *The 2009 Forest Plan has a Vegetation Goal for Biodiversity on page 43, which reads: "A variety of disturbance processes are managed or allowed to occur that produce resilient vegetation communities able to sustain diversity in the face of uncertain future climate-influenced disturbances. Resilient vegetation communities will have a mosaic of species and age classes of trees, shrubs, grasses, and forbs for animal forage and cover, and perpetuate the diversity of plants and the microbial and insect communities upon which they are dependent. Old growth is managed on a forestwide basis and is well distributed." Effects to the wildlife resource addressed in the DEIS includes impacts to ecosystem function as it pertains to species' habitats.*
4	**Nappi, Antoine Ph.D., Pierre Drapeau Ph.D., Jean-François Giroux Ph.D. and Jean-Pierre Savard Ph.D. "Snag use by foraging black-**

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	backed woodpeckers (*Picoides articus*) in a recently burned eastern boreal forest." The Auk 120(2): 505-511. 2003. "Contrary to what you may think, a forest fire does not reduce everything to a lifeless ash. Instead, it leaves behind a landscape of blackened trees interspersed with remnants of green, intact forest. Post-fire specialists such as wood-boring insects quickly colonize the dead trees (snags), attracting an array of woodpeckers." "Identifying the ecological value of a post-fire structure and the characteristics that make it attractive to wildlife is important." http://www.bioone.org/doi/full/10.1642/0004-8038%282003%29120%5B0505%3ASUBFBW%5D2.0.CO%3B2 **Review: Not Relevant to the Project** *The citation refers to a peer-reviewed science investigation concerning black-backed woodpecker use of post-fire eastern black spruce stands in Quebec, Canada. The Flint Foothills Project does not contain or propose to treat post-fire areas. In addition, species responses to conditions in eastern black spruce stands in Quebec are likely not applicable to lodgepole pine forests conditions in the Flint Foothills project area.*
4	**Nappier, Sharon. "Lost in the Forest: How the Forest Service's Misdirection, Mismanagement, and Mischief Squanders Your Tax Dollars" Taxpayers for Common Sense, 2002.** "As a result of the Forest Service's well-documented mismanagement over many years of the timber sale program, taxpayers also have been stuck with the tab for hundreds of millions of dollars worth of subsidies to a profitable timber industry." http://www.ourforests.org/fact/lostintheforest.pdf **Review: Not Relevant to the Project** *The article cited is an opinion paper offering review and comment regarding the road maintenance backlog on National Forest System lands, the costs associated with the construction of new logging roads, the taxpayer's subsidies for road construction and the Forest Service inability to provide data that displays the cost of its timber sale program. The author describes this as "chronicled waste, fraud, and fiscal abuse at the agency." The citation is taken from the executive summary of the document and refers to the Bush administration's failure to address road maintenance while advancing an agenda that promotes new road construction. The article also cites a 2001 GAO report associated with the cost of the timber sales program. In the article, the Forest Service commented that they will be implementing a new accounting system to track and evaluate the timber sale program.* *In the article five recommendations were made to the Forest Service, not directly referencing the Flint Foothills project, that are national in scale and deal with Forest Service policy at the Washington Office level.*
4	**Noble, Ian R. and Rodolfo Dirzo Ph.D. "Forests as Human-Dominated Ecosystems." Science Vol. 277. No. 5325, pp. 522 – 525. 25 July 1997.** "Agroforestry does reduce biodiversity. In forests used for logging, whole-landscape management is crucial. Here, emphasis is placed on areas of intensive use interspersed with areas for conservation and catchment purposes. Management strategies for sustainable forestry are being

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	developed, but there is a need for further interaction among foresters, ecologists, community representatives, social scientists, and economists.” http://www.sciencemag.org/cgi/content/abstract/277/5325/522?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=logging&searchid=1136659907310_5043&FIRSTINDEX=0&journalcode=sci **Review: Not Relevant to the Project** *This opinion piece in a magazine does not address any aspect of the Flint Foothills project.*
4	**Northup, Jim. 1999. “Public Wants More Wilderness, Less Logging on Green Mountain NF”. Press Release by Forest Watch, a Vermont-based environmental organization.** “The U.S. Forest Service has been sitting on a public opinion survey it commissioned, not knowing what to do with the results. The problem is that most people surveyed want more wilderness areas and less logging on the Green Mountain National Forest (GMNF), while the federal agency seems to want to build more roads and cut more trees.” “The survey conducted by Dr. Robert Manning of the School of Natural Resources at the University of Vermont, polled 1,500 Vermont households in the spring of 1995. A survey with similar results was completed last fall for the White Mountain National Forest in New Hampshire. ‘It is clear that New England residents value the national forest for many reasons, but non-material values, such as aesthetics and ecological protection, are more important than material values, such as economic development,’ said Dr. Manning.” “The responses to several survey questions indicate a strong public desire for more areas of wild, untouched nature on the GMNF and less roadbuilding and logging. Very few people supported clearcutting and other types of industrial logging, especially if natural beauty or wildlife habitat were harmed.” “For example: 82 percent wanted to ban clearcutting, 82 percent said logging should not hurt scenic beauty, 80 percent of the respondents wanted to protect remaining undisturbed forest; and 72 percent urged prohibition of logging if bear or other wildlife habitat would be harmed.” “Only 36 percent felt that management of the GMNF should emphasize timber and lumber products; and only 15 percent felt that jobs are more important than protection of endangered species.” “’The results of this survey and a similar one on the White Mountain National Forest in Vermont should serve as loud wake-up calls to the U.S. Forest Service,’ said Northup. ‘Forest Service officials have two choices: either begin a major overhaul of the agency’s management programs or ignore the wishes of the people they are supposed to serve’.” http://www.forestwatch.org/content.php?id=10

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	Review: Not Relevant to the Project *This is an interesting survey but the population that was sampled was Vermont residents, so results are not representative of the larger U.S. population.*
4	**Noss, Reed F. Ph.D. 1987. "Roads and their Impacts" in Natural Areas Journal.** "Studies involving some small and medium-sized mammals have shown that they will usually not cross roads, including forest roads not open to public traffic. Roads result in emissions and disturbances such as noise, dust, light, exhaust, increased salinity in ditches and waterways, and chemical and mechanical vegetation control. Roadkill in Ontario is high for many species. Roads fragment, eliminate and change habitats Habitats are directly lost to road construction and to the activities permitted by road access. Habitat conversion from forest 'interior' to forest 'edge' results in changes and declines in interior-dependent species. Fragmented forest habitats are more susceptible to nest predation and parasitism, and reduce the abundance of some migratory species, such as some declining neotropical migrants. Many animals avoid areas with high road densities. Roads increase access Harvest pressures on fish and wildlife increase dramatically in newly roaded areas. Almost all wilderness roads are built to remove natural resources. Roads are unnatural travel corridors and migration routes Carnivores such as wolves and coyotes will use roads as corridors into previously difficult-to-access areas, increasing predation. Non-native plants and animals use roads as corridors for dispersal, and compete with native flora and fauna. Roads erode soils and impact waterways Road construction and maintenance, and subsequent erosion and gullying, flush road materials into streams and lakes, harmfully altering ecosystems and fish habitats." http://www.ontarionature.org/brochures/endoftheroad/impact.html **Review: Relevant to the Project** T*he paper was no longer available via the link. However, the sections included above lists potential effects of roads on wildlife. Many of the effects discussed in this paper are those associated with paved, well-maintained, high-speed roads. However, it is recognized that lower-standard, unpaved Forest roads have effects as well. The effects of displacement and avoidance were addressed in the Forest Plan and it provides wildlife secure habitat through management of open motorized road and trail densities. This direction is discussed in the Flint Foothills wildlife analysis. Effects of roads on aquatic systems and species are discussed in the aquatics analysis of the EIS.*

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1	**Noss, Reed F. Ph.D. 1993. "The Wildlands Project Land Conservation Strategy." *Wild Earth Journal, Special Issue*: 10-26** "State-of-the-art conservation biology and the principles that underlie the agency's policy of "ecosystem management" dictate an increasing focus on the landscape-scale concept and design of large biological reserves accompanied by buffer zones and habitat connectors as the most effective (and perhaps only) way to preserve wildlife diversity and viability (Noss 1993)." **Review: Not Relevant to the Project** *The referenced article was not available on the Council's website. Per the citations provided, species were reviewed for inclusion in the viability analysis as part of the Forest Plan Revision process. All species determined to be "at-risk" were included. The viability analysis found that based on Forest Plan management direction, conservation of individual species at the Forest and project level was achieved. Forest Plan management direction has been incorporated into this project. The analysis area used is disclosed in the analysis and varies by species. This project also includes an analysis of forest-associated "at-risk" species and is discussed in the wildlife analysis.*
4	**Noss, Reed F., Ph.D. 1995. "The Ecological Effects of Roads or the Road to Destruction." *Wildlands CPR*** "Roads sever animal and plant habitats and populations" "Nothing is worse for sensitive wildlife than a road. Over the last few decades, studies in a variety of terrestrial and aquatic ecosystems have demonstrated that many of the most pervasive threats to biological diversity – habitat destruction and fragmentation, edge effects, exotic species invasions, pollution, and overhunting – are aggravated by roads. Roads have been implicated as mortality sinks for animals ranging from snakes to wolves; as displacement factors affecting animal distribution and movement patterns; as population fragmenting factors; as sources of sediments that clog streams and destroy fisheries; as sources of deleterious edge effects; and as access corridors that encourage development, logging and poaching of rare plants and animals." "Most public agencies disregard the ecological impacts of roads, and attempt to justify timber roads as benefiting recreation and wildlife management. Even when a land manager recognizes the desirability of closing roads, he or she usually contends that such closures would be unacceptable to the public." "The Forest Service and other public agencies will claim that road closures, revegetation, and other restorative measures are too expensive to be implemented on a broad scale. But much of the approximately $400 million of taxpayers' money squandered annually by the Forest Service on below-cost timber sales goes to road-building. Road maintenance is also expensive. Virtually all of this money could be channeled into road closures and associated habitat restoration. This work would be labor-intensive, and providing income to the many laid off loggers, timber sale planners, and road engineers – for noble jobs, rather than jobs of destruction!" http://www.wildlandscpr.org/ecological-effects-roads **Review: Relevant to the Project** *This report focuses on roads, highlighting common economic perspective on roads. Road work is generally limited to routes required to haul cut timber, or work to improve the ecological effects of existing roads. Many of the effects discussed in this paper are those associated with paved, well-*

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	maintained, high-speed roads. However, it is recognized that lower-standard, unpaved Forest roads have effects as well. The effects of displacement and avoidance were addressed in the Forest Plan and it provides wildlife secure habitat through management of open motorized road and trail densities. This direction is discussed in the Flint Foothills wildlife analysis (especially grizzly bear, wolverine and elk sections). *This project calls for 7.2 miles of temporary road that will be closed to public use and it will not be used for wildlife management. Temporary roads will be obliterated upon completion of scheduled activities. The construction of 1.3 miles of NFS road that will be managed as closed to the public are addressed as well.*
4	**Noss, Reed F. Ph.D., Jerry F. Franklin Ph.D., William Baker, Ph.D., Tania Schoennagel, Ph.D., and Peter B. Moyle, Ph.D. 2006. "Ecological Science Relevant to Management Policies for Fire-prone Forests of the Western United States" Society for Conservation Biology, February 24, 2006.** "Trees that survive the fire for even a short period of time are critical as seed sources and as habitat that will sustain many elements of biodiversity both above and below ground. The dead wood, including large snags and logs, is second only to live trees in overall ecological importance." http://www.nifc.gov/fuels/downloads/planning/EcologicalScience.pdf **Review: Relevant or Not Relevant to the Project** *The document was not located. From the quote above, this reference is not relevant as the project is not a post-fire proposal. A panel of authors summarizes key science findings associated with restoration of characteristic fire regimes. The Flint Foothills DEIS acknowledges the importance of snags and downed logs to wildlife and meets Forest Plan standards that direct retention of these habitat components.*
4	**Oko, Dan and Ilan Kayatsky. "Fight Fire with Logging?" *Mother Jones,* August 1, 2002** "Still, forestry experts warned in the 2000 plan that logging should be used carefully and rarely; in fact, the original draft states plainly that the "removal of large merchantable trees from forests does not reduce fire risk and may, in fact, increase such risk." "Now, critics charge that the Bush administration is ignoring that warning. Neil Lawrence, a policy analyst with the Natural Resource Defense Council, claims that Washington has taken a far more aggressive approach to incorporating commercial logging in its wildfire prevention plans. As a result, Lawrence and other critics say, the National Fire Plan is becoming a feeding ground for logging companies. Moreover, critics claim the administration's strategy, far from protecting the lives and homes of those most at risk, could actually increase the likelihood of wildfires." http://www.motherjones.com/news/feature/2002/08/fireplan.html **Review: Not Relevant to the Project** *This is an opinion and not a peer reviewed scientific paper and the commenter does not address how their statement either supports or is in contrast to our project. In addition the Flint Foothills project does not propose to remove large merchantable trees to reduce fire risk.*
4	**Ortega, Yvette K.; Capen, David E. 1999. "Effects of forest roads on habitat quality for Ovenbirds in a forested landscape" Auk. 116(4): 937-946.**

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	"Numerous studies have reported lower densities of breeding Ovenbirds (*Seiurus aurocapillus*) adjacent to forest edges. However, none of these studies has considered habitat use and reproductive success to address mechanisms underlying the observed pattern, and most were conducted in fragmented landscapes and ignored juxtapositions of forest with narrow openings such as roads. We studied the influence of forest roads on Ovenbird density in an extensively forested region of Vermont, evaluating habitat use and reproductive success relative to mechanisms proposed to explain the density-edge relationship. Territory densities on seven study plots were 40% lower within edge areas (0 to 150 m from unpaved roads) than within interior areas (150 to 300 m from roads). We simulated the distribution of Ovenbird territories and concluded that passive displacement, where birds perceive habitat interfaces as boundaries and limit their territories entirely to forest habitat, did not account for the observed density-edge pattern. Territory size was inversely related to distance from roads, providing an alternative explanation for reduced densities near edges and suggesting that habitat quality was higher away from roads. Pairing success was lower within edge areas than within interior zones, but the difference was not statistically significant. The proportion of males that produced fledglings did not differ between edge and interior areas. We conclude that habitat quality for Ovenbirds may be lower within 150 m of unpaved roads in extensive forested landscapes, affecting territory density and possibly reproductive success." http://www.fs.fed.us/rm/pubs_other/rmrs_1999_ortega_y001.html **Review: Not Relevant to the Project** *Ovenbirds have not been identified as a species at-risk and were not analyzed for the Forest Plan or this project.*
4	**Parfitt, Ben and Laurel Brewster. 2000. "Muddied Waters: The Case for Protecting Water Sources in B.C." A publication of: the Tuwanek Ratepayers Association, the Red Mountain Residents Association, the B.C. Watershed Stewardship Alliance, and the B.C. Tap Water Alliance.** "Each year in British Columbia more than 200,000 hectares of forest is logged, the majority of it clearcut." "Almost all of that logging activity takes place in watersheds or forested valleys that contain important surface water supplies such as reservoirs, lakes, rivers or streams. Often, valleys contain a multitude of water bodies connected with one another. The small ephemeral streams in a valley's upper reaches feed into bigger creeks that carry water into valley-bottom rivers." "This report examines the costs to human communities and fisheries when logging-related damage to these interconnected and finely balanced water systems occurs." "As this report reveals, the costs are extremely high. If the 100 B.C. communities outside of Vancouver and Victoria who currently use unfiltered water from surface sources were forced to filter their water to get rid of unwanted sediments, the cost would be about $700 million. The ongoing cost of running the new filtration plants would be about $30 million annually. Such costs can be avoided, but only if land-use practices around surface supplies don't muddy the water." "Logging in watersheds also poses significant threats to the environment, particularly the critically important in-stream habitats of spawning and rearing salmon. Every time a logging road or logging operation triggers increased water runoff into streams, chances are high that elevated levels of sediment and debris are washed into waterways inhabited by fish."

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	"To date, more than $300 million in public money has been channeled through the Crown Corporation, Forest Renewal BC, to pay for "watershed restoration" projects in the province. Expenditures to clean up streams and surrounding hillsides damaged by logging activities continue. It was recently estimated that up to 40 years of funding might be required to rehabilitate salmon habitat and surrounding forests damaged by logging." "Clearly, the public has paid and will continue to pay a steep price for logging practices that damage surface waters." http://www.library.for.gov.bc.ca/ipac20/ipac.jsp?session=1RW012320B660.2434272&profile=mof&source=~!forest&view=subscriptionsummary&uri=full=3100001~!46491~!9&ri=1&aspect=basic_search&menu=search&ipp=20&spp=20&staffonly=&term=parfitt&index=.GW&uindex=&aspect=basic_search&menu=search&ri=1#focus **Review: Not Relevant to the Project** *The article was not available on-line. This report is specific to British Columbia and discusses and the price communities pay to treat surface water affected by logging-related sediment and the long-term costs to restore impacted fish habitat. It is not specific to the Flint Foothills Project area in Montana or surrounding communities.*
4	**Parks and Recreation-Troy-Michigan. "Why Does the City Leave Dead Trees" June, 2007.** http://troymi.gov/ParksRec/Trees/DeadTrees.asp "Scientists believe a scattering of dead trees goes far beyond looks. Dead trees support birds that actually decrease populations of harmful insects. Studies by Cooperative Extension Service have demonstrated that a large population of forest birds appreciably reduces problems for tree owners caused by insects and small mammals. An example is the woodpecker. It can hold down bark beetles and can control as much as 65% of emerging pine beetles. All ash trees dying from emerald ash borer show aggressive signs of feeding woodpeckers. Dead branches serve as necessary perches for hawks, owls and similar birds of prey. Birds that play and important role in the control of mice, gophers and rabbits that wreak havoc with our landscapes, lawns and gardens. To that end, as the City goes through its parks and natural areas, removing dead trees, we will leave some standing. Additionally, in unobtrusive areas, we intended to leave piles of branches and the occasional log. All this in the hope that the diversity of wildlife in Troy's urban forest will flourish and, in so doing improve the quality of our lives as well." **Review: Not Relevant to the Project** *The citation consists of a website bulletin provided by the Park and Recreation Department, Troy, Michigan, explaining the City's dead and dying urban tree removal policy. The contents of the bulletin have little applicability to the wildlife analysis conducted for the Flint Foothills Project due to a lack of specificity associated with snag-dependent species and conditions in the analysis area.*
1	**Paul F. Hessburg and John F. Lehmkuhl. 1999. "Science Peer-Review Summary of the Wenatchee National Forest's Dry Forest Strategy." USDA Forest Service, Pacific Northwest Research Station, Wenatchee, WA. June 1, 1999** "Also, Hessburg and Lemkuhl (1999) suggest that prescribed burning alone can be utilized in many cases—possibly here—where managers

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	typically assume mechanical fuel reductions must be used." http://www.subtleenergies.com/ormus/Fire/dryforest.htm **Review: Not Relevant to the Project** *The peer-review summary was of a specific project on the Wenatchee National Forest. The BDNF project has many of the same elements as the project referenced, and includes similarly designed treatments, including prescribed burning. The quote above suggests that the document referenced speaks to using prescribed burning alone. Reviewing the document, it actually recommends a combination of thinning and burning as preferred treatments. The Flint Foothills Project is not proposing using prescribed fire or mechanical means to reduce fuels.*
1	**Pellant, M. 1990. The cheatgrass-wildfire cycle – are there any solutions: Pages 11-18 in Proceedings – Symposium on cheatgrass invasion, shrub die-off and other aspects of shrub biology and management. USDA Forest Service. Intermountain Research Station. General Technical Report INT-** As related to letter 1, comment 35; additional literature to address **Review: Relevant to the Project** See previous response on this citation.
4	**Perry, David A. Ph. D. From testimony at a Senate Field Hearing on Forest Health. August 29, 1994.** "Before discussing the above points in more detail, it is important to specify what the term health as applied to a forest ecosystem means to me; I believe my views reflect those of most ecological scientists. A healthy system is one that retains the integrity of its basic structure and processes, including viable populations of indigenous species. Some level of disease and tree death is normal and beneficial in forests; ecosystem health is not so much the absence of disease and death as it is the ability to contain these natural forces within certain bounds and the robustness to resist or recover quickly from environmental stresses. These system properties of "resistance" and "resilience" are closely associated in turn with species diversity and in particular with the multiplicity of interactions among species that compose the system. Although healthy trees are prerequisite to healthy forest ecosystems, health encompasses much more than trees, and forest health correlates much more closely with structure and processes than with how fast trees are growing." http://www.subtleenergies.com/ormus/Fire/D_PERRY.htm **Review: Not Relevant to the Project** *This comment is taken from a testimony that 'refers primarily to forest of Idaho, eastern Oregon and eastern Washington'. The discussion quoted mirrors Beaverhead-Deerlodge Forest Plan vegetation objectives, which the project purpose and need and proposal design follow.*
4	**Peters, Robert L. Ph.D, Evan Frost, and Felice Pace. 1996 "Managing for Forest Ecosystem Health: A Reassessment of the 'Forest Health Crisis"**

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	"Traditionally, the term 'forest health' has been used in a limited, utilitarian sense by professional foresters to refer to the growth and vigor of trees (see Kolb et al. 1994). For example, according to one Forest Service publication, a forest is healthy when "biotic and abiotic influences on forests do not threaten management objectives now or in the future" (USFS 1993). From this perspective, a forest is healthy if trees are free from insects and pathogens and growing at maximum rates; it is unhealthy if trees are dead or dying. Anything that decreases or threatens to decrease yield (insects, disease, decaying trees, fire) is something to be controlled or eliminated. Managers therefore argue for removal and commercial utilization of trees that are perceived to be in danger from such threats." "However, many conservationists and forest scientists have expressed concern about such thinking. This narrow definition of forest health does not consider the health of the entire ecosystem, such as water and soil quality and the diversity and interactions of other life forms. It does not provide guidance for management of resources other than timber. It has encouraged foresters to simplistically view insects and other non-timber elements of forest ecosystems as good or bad, based only on how they affect the growth rates of commercial tree species." "When viewing forests from an ecosystem health perspective, scientists do not recognize the 'forest health crisis' described by the proponents of salvage logging who are concerned about losing economically valuable timber to fire or insects. To the scientists, insects, disease and fire are normal parts of healthy ecosystems, essential for forest regeneration, cycling of nutrients and maintaining a variety of dead and living trees for wildlife habitat. Attempts to control or eliminate these agents may lead to unforeseen and undesirable consequences. For example, widespread removal of dead and dying trees eliminates habitat required by bird species that feed on insects that attack living trees, with the result that outbreaks of pests may increase in size or frequency (Torgersen et al. 1990)." http://www.magicalliance.org/Forests/Forest%20Health%20Evaluated.htm **Review: Not Relevant to the Project** *The link did not work. However, based on the quote provided, this paper is based on using salvage activities as a tool to reduce fire hazard and/or insect and disease epidemics to improve forest health. There is confusion as to which document "USFS 1993" is since no bibliography was included with this reference and there are many references available that could fit this citation. Current direction for National Forest Resource Management is in the Forest Service Manual (FSM) Chapter 2020.2: "The aim is to reestablish and retain ecological resilience of National Forest System lands and associated resources to achieve sustainable management and provide a broad range of ecosystem services. Healthy, resilient landscapes will have greater capacity to survive natural disturbances and large scale threats to sustainability, especially under changing and uncertain future environmental conditions, such as those driven by climate change and increasing human uses." Clarification on this point was not provided by the commentor, thus this review is based solely on the excerpt provided in the comment and does not take into account the reference "USFS 1993." The purpose and need of this project does not include any proposals to prevent decreases to yield, reduce fire hazard or losses to insects and disease, or to improve forest health or any proposed actions intended to meet such objectives.*
4	**Peterson, Mike. From testimony to the Senate Agriculture, Nutrition, and Forestry Committee concerning the Healthy Forests Restoration Act, HR 1904. June 26 2003.** "H.R 1904 does not include any specific measures to protect homes or communities. It is also inconsistent with the Western Governors' Association 10-Year Comprehensive Strategy, which does not call for any changes in existing laws. The only proven method to protect homes and

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	communities is to reduce flammable materials in the immediate vicinity of structures, yet the definitions in H.R. 1904 would not require any activities to be near homes. Instead, the bill seeks to further subsidize the timber industry and eliminate obstacles to logging large, fire-resistant trees miles away from the nearest home. The country's top forest scientists, including the Forest Service's own scientists, have found that this kind of logging can actually increase fire risk and make fires larger and more intense." http://agriculture.senate.gov/Hearings/testimony.cfm?id=824&wit_id=2258 **Review: Not Relevant to the Project** *Most of the quotation is unsupported opinion and is general and not specific to the Flint Foothills project. The Flint Foothills project is not a fuels project and is not designed to protect homes.*
4	**Platt, Rutherford V. Ph.D., Thomas T. Veblen Ph.D., and Rosemary L. Sherriff. "Are Wildfire Mitigation and Restoration of Historic Forest Structure Compatible? A Spatial Modeling Assessment" Published Online: by the by Association of American Geographers. Sep. 8, 2006.** "In response to catastrophic wildfires, wide-reaching forest management policies have been enacted in recent years, most notably the Healthy Forests Restoration Act of 2003. A key premise underlying these policies is that fire suppression has resulted in denser forests than were present historically in some western forest types. Therefore, although reducing the threat of wildfire is the primary goal, forest managers commonly view fuel treatments as a means to restore historic forest structure in those forest types that are outside of their historic range of variation. This study evaluates where both wildfire mitigation and restoration of historic forest structure are potentially needed in the ponderosa pine–dominated montane forest zone of Boulder County, Colorado. Two spatial models were overlain: a model of potential fireline intensity and a model of historic fire frequency. The overlay was then aggregated by land management classes. Contrary to current assumptions, results of this study indicate that both wildfire mitigation and restoration of historic forest structure are needed in only a small part of the study area, primarily at low elevations. Furthermore, little of this land is located on Forest Service land where most of the current thinning projects are taking place. We question the validity of thinning as a means both to reduce the threat of wildfire and to restore historic forest structure in the absence of site-specific data collection on past and present landscape conditions." http://www.ingentaconnect.com/content/routledg/anna/2006/00000096/00000003/art00001 **Review: Not Relevant to the Project** *The Flint Foothills is not a fuels project as indicated by the comment.*
4	**Potyondy, John P. 2007. "The Evolution of Channel Maintenance Science in the Forest Service"** Mr. Potyondy is the WO Watershed, Fish, Wildlife, Air, and Rare Plants Staff "Since that time, they have consulted with a wide array of scientists in the Forest Service, other agencies, universities, and consultants, with the aim of arriving at a consensus on the best science available to address this issue." http://www.stream.fs.fed.us/afsc/pdfs/Potyondy.pdf

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	Review: Not Relevant to the Project *This article is not peer reviewed and is not relevant because it describes channel maintenance flow determinations on Forest Service managed lands. This project did not involve any channel maintenance determinations.*
4	**Powell, Douglas S. Ph.D, Joanne L. Faulkner, David R. Darr, Zhiliang Zhu Ph.D. and Douglas W. MacCleery. 1992. "Forest Resources of the United States." USDA Forest Service. Rocky Mt. Forest and Range Experiment Station. Gen. Tech. Rep. RM-234.** "Private lands are more suitable for timber production. National Forest land is on average of lower productivity and on steeper, higher elevation terrain than are private forestlands." http://www.fs.fed.us/rm/pubs_rm/rm_gtr234.html **Review: Not Relevant to the Project** *This General Technical Report summarizes the forest resources in the United States in 1992. From the Introduction: "As required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), this report updates information on the Nation's forest resource, particularly the timber resource." This report is data compilation and summary and does not provide opinions or options for forest management. The specific citation is only partly accurate as quoted. The second sentence was found on page 8 of the reference as follows (emphasis added): "As a consequence, National Forest timberland is, on average, of lower productivity and on steeper, higher elevation terrain than are private timberlands." The first sentence was not found as quoted or in any form within the reference.*
1	**Powers, L. A. Dale, P. Gaede, C. Rodes, L. Nelson, J. Dean, and J. May. 1996. Nesting and food habits of the flammulated owl (Otus flammeolus) in southcentral Idaho. J. Raptor Research 30:15-20.** **http://elibrary.unm.edu/sora/jrr/v030n01/p00015-p00020.pdf** As related to letter 1 comment 35; additional literature to address **Review: Relevant to the Project** *The citation referenced is a peer-reviewed scientific paper concerning the food habits of flammulated owls in Idaho. Pertinent information contained in the paper is utilized in the Flint Foothills wildlife analysis.*
4	**Quigley, Thomas M. Ph.D., Richard W. Haynes and Russell Graham Tech. editors. 1996. "Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin and Portions of the Klamath and Great Basins." USDA Forest Service, PNW-GTR-382, 303 p.** "Fire severity has generally increased and fire frequency has generally decreased over the last 200 years. The primary causative factors behind fire regime changes are effective fire prevention and suppression strategies, selection and regeneration cutting, domestic livestock grazing, and the introduction of exotic plants." http://www.fs.fed.us/pnw/publications/icbemp.shtml

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	Review: Not Relevant to the Project *We agree there are many factors that have an effect on fire severity. This statement is not relevant to the Flint Foothills Project because the purpose and need doesn't address fuels or fire severity.*
4	**Raven, Peter, PhD, From his February 9, 2001 letter to Senator Jean Carnahan.** "The Act to Save America's Forests is based on the principles of conservation biology. It would make the protection native biodiversity the primary goal of federal forest management agencies. The bill would protect over 20 million acres of core forest areas throughout the nation, including ancient forests, roadless areas, key watershed, and other special areas. It is a comprehensive, sustainable, and ecologically-sound plan for protecting and restoring the entire federal forest system. If the current pace of logging planned by the Forest Service continues, nearly all of America's ancient and roadless wild forests will soon be lost forever. According to a recent report by the World Resources Institute, only one percent of the original forest cover remains in large blocks within the lower 48 states. The Act to Save America's Forests incorporates the solution recommended by the report, namely to protect core forest areas from any logging and to allow sustainable forest practices around these protected forests. Endorsed by over 600 leading scientists, this bill may be the last hope for America's forests." http://www.saveamericasforests.org/Raven.htm **Review: Not Relevant to the Project** *This was from a letter to Congress signed by over 600 scientists urging passage of the Act to Save America's Forests, not directly referencing the Flint Foothills Vegetation Management Project. They state that clearcutting and other even-aged silvicultural practices and timber road construction have caused widespread forest ecosystem fragmentation and degradation. This proposed legislation did not be become law. Thus, this article is not relevant to the site-specific Flint Foothills environmental analysis.*
4	**Raven, Peter, Ph.D., Jane Goodall, C.B.E., Ph.D., Edward O. Wilson, Ph. D. and over 600 other leading biologists, ecologists, foresters, and scientists from other forest specialties. From a 1998 letter to congress.** "Less than 5% of America's original forests remain, and these forests are found primarily on federal lands. Logging in the last core areas of biodiversity is destroying the remaining intact forest ecosystems in the United States. At the current rate of logging, these forests and their priceless biological assets will be destroyed within a few decades. We urge Congress to pass the Act to Save America's Forests. It is the first nationwide legislation that would halt and reverse deforestation on all our federal lands. By implementing protective measures based on principles of conservation biology, the bill provides a scientifically sound legislative solution for halting the rapid decline of our nation's forest ecosystems. The Act to Save America's Forests will: Make the preservation and restoration of native biodiversity the central mission of Federal forest management agencies.

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	Ban extractive logging in core areas of biodiversity and the last remnant original forest ecosystems: roadless areas, ancient forests and special areas of outstanding biological value. Protect sensitive riparian areas and watershed values by banning extractive logging in streamside buffer zones. End clearcutting and other even age logging practices on federal land. Establish a panel of scientists to provide guidance to federal forest management. We believe it is our professional responsibility to ask Congress to align Federal forest management with modern scientific understandings of forest ecosystems. Passage of the Act to Save America's Forests will give our nation's precious forest ecosystems the best chance or survival and recovery into the 21st century and beyond." http://www.saveamericasforests.org/resources/Scientists.htm **Review: Not Relevant to the Project** *This citation is from a letter that supported the 2001 proposed Act to Save America's Forests Legislation. According to the letter, the Act would have ended logging in all the remaining Northwest Ancient Forests, ended logging in all remaining roadless forests, and ended logging in "special" forest areas throughout the federal forest system, such as the giant Sequoia forests in California. In addition, the Act would have banned clearcutting in the national forests. The proposed legislation did not become law. Thus, this article is not relevant to the Flint Foothills Vegetation Management Project.*
4	**Reed, R.A., Johnson-Barnard, J., and Baker, W.A. 1996. "Contribution of Roads to Forest Fragmentation in the Rocky Mountains." Conservation Biology 10: 1098-1106.** "Increasingly, previously extensive, continuous tracts of forest are being reduced to widely dispersed patches of remnant forest vegetation by logging and road-building, but few measures of the effects of roads on forest fragmentation are available. Fragmentation affects animal populations in a variety of ways, including decreased species diversity and lower densities of some animal species in the resulting smaller patches. This study seeks to quantify the effects of roads and logging activities on forest habitat." "Roads precipitate fragmentation by dissecting previously large patches into smaller ones, and in so doing they create edge habitat in patches along both sides of the road, potentially at the expense of interior habitat. As the density of roads in landscapes increases, these effects increase as well. McGurk and Fong (1995) considered the additive effects of clearcuts and roads, but did not measure the amount of associated edge habitat. Thus a more direct measurement of the impacts of roads on landscapes is needed." http://cpluhna.nau.edu/Research/contribution_of_roads_to_forest_.htm **Review: Relevant to the Project** *Information is included in the Flint Foothills wildlife analysis that addresses potential effects of existing and temporary roads on wildlife and/or habitat (see analyses for grizzly bear, wolverine, and elk).*

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4	**Reice, Seth, Ph.D. 1998. Statement. Press conference with Senator Robert Torricelli, April 28, 1998.** “Disturbances, from windthrown trees to fires, are natural in forests and are essential for forest ecosystem well being. For example, fire is a disturbance in forests, but it is also beneficial. While disturbances kill some individuals, they also open up ecological living space for recolonization by many previously excluded species.” “Without fire, natural succession is upset. In a forest where fire has been unnaturally suppressed for many years (50 or more), fire intolerant trees grow unchecked, suppressing and outcompeting the normally dominant fire resistant trees. Overall biodiversity is reduced. As the tree diversity declines, the habitat becomes unsuitable for a large portion of the forest species. Animal species are lost, since the animals use the fire tolerant variety of tree species for food, shelter and nest sites.” http://www.saveamericasforests.org/news/ScientistsStatement.htm **Review: Not Relevant to the Project** *The paper referenced is a compilation of statements in support of a bill before Congress in 1998. The quote above speaks to natural disturbances in forests, and more specifically that without fire, natural succession is upset. The analysis for this project speaks to the same processes – natural disturbances, including fire – and the effects of removing those disturbances over the past 100 years within the project area. However, the paper referenced is more focused on the idea of saving America’s Forests, in support of the proposed Congressional bill, and does not have relevance to this project. The document consists of statements from six scientists supporting the passage of the Act to Save America’s Forests. This proposed legislation did not be become law. Thus, this article is not relevant to the site-specific Flint Foothills environmental analysis.*
4	**Reid, L. M. Ph.D. and T. Dunne (1984), “Sediment Production from Forest Road Surfaces” Water Resour. Res., 20(11), 1753–1761** “Erosion on roads is an important source of fine-grained sediment in streams draining logged basins of the Pacific Northwest. Runoff rates and sediment concentrations from 10 road segments subject to a variety of traffic levels were monitored to produce sediment rating curves and unit hydrographs for different use levels and types of surfaces. These relationships are combined with a continuous rainfall record to calculate mean annual sediment yields from road segments of each use level. A heavily used road segment in the field area contributes 130 times as much sediment as an abandoned road. A paved road segment, along which cut slopes and ditches are the only sources of sediment, yields less than 1% as much sediment as a heavily used road with a gravel surface.” http://www.agu.org/pubs/crossref/1984/WR020i011p01753.shtml **Review: Relevant to the Project** *This peer-reviewed journal article looks at some of the effects of road types and use levels on turbidity and sedimentation. Heavily used roads can contribute significant amounts of sediment compared to lightly used roads of the same type. For this project, most roads are native or gravel surface roads, and roads used for the project will receive heavy use at times. However, BMPs that have been demonstrated to be effective at controlling sediment and road maintenance will be used to minimize sedimentation from all project roads. Model results and monitoring have shown that significant reductions in sedimentation would occur from road maintenance and applying BMPs to roads, even for roads that are more heavily used.*

Letter Number	Literature
4	**Reid, Leslie M. Ph.D., Robert R. Ziemer Ph.D., and Michael J. Furniss. 1994. "What do we know about Roads?" USDA Forest Service.** "Roads are associated with high sediment inputs and altered hydrology, both of which can strongly influence downstream channel habitats. Roads are also important as a source of indirect human impacts and as an agent of vegetation change and wildlife disturbance." "Any ground disturbance increases the potential for erosion and hydrologic change, and roads are a major source of ground disturbance in wildlands. Compacted road surfaces generate overland flow, and much of this flow often enters the channel system, locally increasing peak flows. Localized peak flows are also increased where roads divert flow from one swale into another, and where roadcuts intercept subsurface flows." "Overland flow from the road surface is a very effective transport medium for the abundant fine sediments that usually are generated on road surfaces. Road drainage also can excavate gullies and cause landslides downslope in swales. Cut and fill slopes are often susceptible to landsliding, and road-related landsliding is the most visible forestry-related erosional impact in many areas." http://www.fs.fed.us/psw/publications/reid/4Roads.htm **Review: Relevant to the Project** *This government workshop note mentions some of the effects of roads on hydrology, turbidity and sedimentation. This article addresses questions regarding which roads need to be maintained, which roads need controlled access, and which roads should be obliterated. It identifies the types of information needed to make these critical decisions. Since this project is not a transportation planning project only some of the information in this article applies to this project.*
4	**Rice, Raymond M. Ph.D., Forest B. Tilley and Patricia A. Datzman.1979. "Watershed's Response to Logging and Roads: South Fork of Caspar Creek, California, 1967-1976." USDA Forest Service, Research Paper PSW-146.** "Disturbances from roadbuilding and logging changed the sediment/discharge relationship of the South Fork from one which was supply dependent to one which was stream power dependent, resulting in substantial increases in suspended sediment discharges." "Road construction and logging appear to have resulted in increases in average turbidity levels (as inferred from suspended sediment increases) above those permitted by Regional Water Quality Regulations." http://www.fs.fed.us/psw/publications/rice/Rice79.pdf **Review: Relevant to the Project** *This peer-reviewed government report looks at some of the effects of forest harvest and roads on hydrology, turbidity and sedimentation in Northern California. The South Fork watershed produced a total of 4,787 cubic yards/square mile excess sediment during the 5 years after logging was started. This sediment represents nearly a threefold increase over that which would have been expected had the watershed remained undisturbed.* *This study was done before forest practice rules were implemented in California, and before the Forest Service had begun to use BMPs to control non-point sources of sediment. Because the Flint Foothill project will use BMPs to reduce sediment, sediment amounts generated from forest harvest and roads will be significantly less than the amounts observed in this study.*

<table>
<tr><th>Letter Number</th><th>Literature</th></tr>
<tr><td>4</td><td>Riedel, Mark S. Ph.D. and James M. Vose Ph.D., “Forest Road Erosion, Sediment Transport and Model Validation in the Southern Appalachians.” Presented at the Second Federal Interagency Hydrologic Modeling Conference, July 28 – August 1, 2002.
“Sediment eroded from gravel roads can be a major component of the sediment budget in streams in this region (Van Lear, et al, 1995).”
http://www.srs.fs.usda.gov/pubs/ja/ja_riedel002.pdf

Review: Not Relevant to the Project
This peer-reviewed government report is not relevant to the project because it looks at a sediment model used in the Appalachians. The Sediment Tool is a spatially explicit, GIS based, finite element, lumped parameter model which generates estimates of soil erosion, sediment routing and sediment yield from forest roads. Instead, the WEPP Roads model was used for this project because it looks at site-specific road erosion.</td></tr>
<tr><td>4</td><td>Roberson, Emily B. Ph.D., Senior Policy Analyst, California Native Plant Society. 2002. Excerpt from a letter to Chief Dale Bosworth and 5 members of congress.
“It is well established that logging and roadbuilding often increase both fuel loading and fire risk. For example, the Sierra Nevada Ecosystem Project (SNEP) Science Team (1996) concluded that “timber harvest…. Has increased fire severity more than any other recent human activity” in the Sierra Nevada. Timber harvest may increase fire hazard by drying of microclimate associated with canopy opening and with roads, by increases in fuel loading by generation of activity fuels, by increases in ignition sources associated with machinery and roads, by changes in species composition due to opening of stands, by the spread of highly flammable nonnative weeds, insects and disease, and by decreases in forest health associated with damage to soil and residual trees (DellaSala and Frost, 2001; Graham et al., 2001; Weatherspoon et al. 1992; SNEP Science Team 1996). Indeed a recent literature review reported that some studies have found a positive correlation between the occurrence of past logging and present fire hazard in some forest types in the Interior Columbia Basin (DellaSala and Frost 2001).”
http://www.plantsocieties.org/PDFs/Fire%20letter%20CNPS%208.02%20letterhead.pdf

Review: Not Relevant to the Project
Surface wind may increase and surface fuels may be drier as a result of thinning from below, but this technique has the effect of requiring longer flame lengths to begin torching and make independent crown fire less probable (Graham et al. 2004). Slash treatments would occur post-harvest on timber units through pile burning at landings, alleviating the concern of residual post-treatment activity slash. The more open stands created through treatment and slash disposal offer firefighters the type of stand conditions that enable safer direct attack opportunities than the pre-treatment. Additionally, the resulting, more open stand conditions (Fuel model 2) have the added benefits of having live fuel associated with the fuel model and lower moisture of extinction, when compared to the current closed timber, moderate or heavy down fuels (Fuel model 8/10). The live fuel has a dampening effect of fire behavior as moisture present absorbs heat and has to be driven off. This can be seen when approaching fires burn into green grass near homes. Moisture of extinction in dead fuels is defined as the upper limits of fuel moisture beyond which a fire will no longer spread with a uniform front (Albini 1976, Anderson 1982). Closed timber fuel models have a moisture of extinction of 30, compared to open timber fuel models which have a moisture of extinction of 15. This results in the open fuel models reaction much faster to environmental change: for example</td></tr>
</table>

Letter Number	Literature
	changes in Dewpoint and Relative Humidity.
1	**Roberts, T. 1990. Cheatgrass: management implications in the 90's.Pages 19-21 in Proceedings – Symposium on cheatgrass invasion, shrub die-off and other aspects of shrub biology and management. USDA Forest Service. Intermountain Research Station. General Technical Report INT-276.** **Review: Relevant to the project** See previous response on this citation.
4	**Robertson F. Dale. From a June 4, 1992 letter to Regional Foresters and Station Directors, Appendix B** "We have made great progress under New Perspectives to get land managers and scientists working together as a team in doing the best job possible. Let's keep it up and make sure our decisions reflect the best science and close the gap between the level of scientific knowledge and its application in our day-to-day management." http://www.fs.fed.us/r1/wmpz/documents/existing-forest-plans/lolo_5_yr_review.pdf **Review: Relevant or Not Relevant to the Project** *This excerpt is from a memo from Chief Robertson outlining his new policy on ecosystem management. A land manager/scientist partnership was one of three point stated that were needed to make ecosystem management successful. The need to utilize the best science is not new; agency decisions have always required a sound scientific basis, per 40 CFR, 1502.24. The Forest Service is currently working under the transition provision of the 1982 planning rule. Under these regulations, the Forest Service is required to consider the "best available science" when implementing site-specific projects within a forest plan. 36 C.F.R. § 219.35(a) (2001). The Flint Foothills Vegetation Management Project considers the latest and best science available—over 100 references are cited in the analyses.*
4	**Roelofs, Terry D. Ph.D. Testimony for the California State Water Board and Regional Water Quality Control Boards Regarding Waivers of Waste Discharge Requirements on Timber Harvest Plans. August 2003.** "I will discuss my views on how activities related to timber harvest adversely affect coastal salmonids in California by destroying, altering, or otherwise disturbing the freshwater habitats upon which these fish depend during crucial phases of their life cycle. I base these opinions on my research and observations in the field, as well as my review of and familiarity with the scientific literature and publications of government agencies, commissions, and scientific review panels. Below I discuss in some detail the life history and habitat needs of coho salmon to illustrate how timber harvest and related roads affect this threatened species. Although Chinook salmon and steelhead trout have similar life histories and habitat needs, and also are negatively affected by timber harvest, I will use coho salmon in my discussion." "Loss or degradation of stream habitat has been and remains the single most significant cause of the decline of anadromous salmonids in general in the Pacific Northwest. In my experience the most pervasive and severe impacts to coastal watersheds in California inhabited by coho salmon result from logging and associated activities. These activities cause significant alteration and degradation to coho salmon habitat by 1) increasing

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	sediment input to salmon bearing streams and their tributaries: 4) by decreasing input of LWD into waterways; 3) by altering streamflow regimes, increasing the likelihood of scouring flows and flooding; and 4) by increasing water temperatures. These pervasive changes due to timber harvest decrease the complexity and suitability of coho salmon habitat, including adversely affecting insects and other organisms that provide food for fish.” http://www.docstoc.com/docs/20957789/ EXPERT-WITNESS-REPORT-OF-TERRY-D **Review: Not Relevant to the Project** This paper discusses how logging and associated activities impact coastal watersheds in California and Coho salmon. RCA buffers and BMPs would be used in the Flint Foothills project to protect streams from sedimentation and temperature increases.
1	**Romme, William H. 1982**. “**Fire and Landscape Diversity in Subalpine Forests of Yellowstone National Park Fire and Landscape Diversity in Subalpine Forests of Yellowstone National Park**.” **Ecological Monographs, Vol. 52, No. 2 (Jun., 1982), pp. 199-221** “For example, the last 70 to 80 years of fire suppression have not had much influence on subalpine landscapes with fire intervals of 200 to several hundred years (Romme and Despain).” **Review: Not Relevant to the Project** *We agree that fire suppression has had less influence on subalpine landscapes than on lower elevation forest landscapes.*
1	**Romme, William H.; Despain, Don G. 1989. Historical perspective on the Yellowstone fires of 1988. Bioscience. 39(10): 695–699.** **http://www.jstor.org/stable/1311000?origin=crossref** **Review: Relevant or Not Relevant to the Project** Unable to answer at this time; cannot locate the document
4	**Romme, W.H., J. Clement, J. Hicke, D. Kulakowski Ph.D. L.H. MacDonald, T.L. Schoennagel Ph.D., and T.T. Veblen. 2006 “Recent Forest Insect Outbreaks and Fire Risk in Colorado Forests: A Brief Synthesis of Relevant Research.”** “Although it may be relatively easy to ascertain whether an individual tree is healthy or not, the concept of “forest health” is very ambiguous. The presence of unhealthy trees does not necessarily imply that the forest as a whole is unhealthy. On the contrary, standing dead trees and fallen logs (coarse wood) play important roles in wildlife habitat, soil development, and nutrient cycling, and are a defining characteristic of old-growth forests. Bark beetle outbreaks rarely kill all of the trees in a stand, because they preferentially attack the larger trees and generally ignore the smaller trees. These smaller trees may be hidden by the red needles of the large killed trees during the peak of the outbreak, such that one often has an impression of total tree mortality. However, once those needles fall it usually becomes apparent that many small and moderate sized trees survived the outbreak. These smaller trees may grow two to four times more rapidly after the outbreak than they did before, because they are no longer competing with the big trees for light, water, and nutrients (Romme et al. 1986). In mixed forests of lodgepole pine and aspen, the aspen may grow more vigorously after beetles kill the dominant pine trees. Even when all of the trees are killed, as in a severe forest fire, the result usually is stand

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	regeneration, as described above for lodgepole pine. Thus, from a purely ecological standpoint, dead and dying trees do not necessarily represent poor "forest health." They may instead reflect a natural process of forest renewal." (pg.11) http://www.cfri.colostate.edu/docs/cfri_insect.pdf **Review: Not Relevant to the Project** *The link provided did not access the referenced paper. However, reading the excerpts provided, there is no use of the phrase 'forest health' in the analysis. In addition, with the current epidemic, the norms of mortality seen on the Forest are outside of the published literature, with 100 percent of lodgepole pine stands and down to 5 inches in diameter sized trees within the stands affected by the mountain pine beetle.*
4	**Rowland, M. M., M. J. Wisdom, B. K. Johnson, and M. A. Penninger. 2005. "Effects of Roads on Elk: Implications for Management in Forested Ecosystems." Pages 42-52 in Wisdom, M. J., technical editor, The Starkey Project: a synthesis of long-term studies of elk and mule deer. Reprinted from the 2004 Transactions of the North American Wildlife and Natural Resources Conference, Alliance Communications Group.** "Early studies of elk were among the first to address effects of roads on wildlife, establishing a precedent for subsequent research on a wide range of terrestrial and aquatic species. These early elk-roads studies included those reported in a symposium on the topic in 1975 (Hieb 1976), the seminal studies of Jack Lyon in Montana and northern Idaho (Lyon 1979, 1983, 1984), the Montana Cooperative Elk-Logging Study (Lyon et al. 1985), and work by Perry and Overly (1977) in Washington and Rost and Bailey (1979) in Colorado. As research and analysis techniques have become more sophisticated, particularly with the advent of geographic information systems (GIS) and high-resolution remote imagery, the study of effects of roads on terrestrial and aquatic communities has evolved into a unique discipline of "road ecology" (Forman et al. 2003). Road effects are far more pervasive than originally believed and include such disparate consequences as population and habitat fragmentation, accelerated rates of soil erosion, and invasion of exotic plants along roadways. Indeed, "in public wildlands management, road systems are the largest human investment and the feature most damaging to the environment" (Gucinski et al. 2001:7). Summaries of the effects of roads on wildlife habitats and biological systems in general have been compiled by Forman and Alexander (1998), Trombulak and Frissell (2000), Gucinski et al. (2001), Forman et al. (2003) and Gaines et al. (2003)." http://www.fs.fed.us/pnw/pubs/journals/pnw_2004_rowland001.pdf **Review: Relevant to the Project** *It is recognized that lower-standard, unpaved Forest roads have potential effects. The effects of displacement and avoidance were addressed in the Forest Plan and provides wildlife secure habitat through management of open motorized road and trail densities. This direction is discussed in the Flint Foothills wildlife analysis, more specifically as it pertains to grizzly bears, wolverines and elk.*
4	**Rudzitis, Gundars. 1999 "Amenities Increasingly Draw People to the Rural West." Rural Development Perspectives, vol. 14, no. 2.** "People moving to the region may do so for reasons related to the social environment and the physical landscape but not care about specific Federal land management practices. We found this not to be true, since 92 percent were concerned with how Federal lands were managed. The

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	most frequent preferences for managing Federal lands were water/watershed and ecosystem protection (table 3). Timber harvesting was cited by 16 percent, grazing and ranching by 6 percent, and mineral exploration/mining by less than 1 percent. Overall, protective strategies made up 76 percent of the preferred management strategies and commodity-based strategies 23 percent. This same trend is evident for the second and third most stated preferences. These findings also contradict the longstanding view of the Federal lands as a public warehouse of commodities to be harvested and jobs to be filled. For newcomers in the rural West, the value of these public lands is related to protecting and preserving them." http://www.ers.usda.gov/publications/rdp/rdpsept99/rdpsept99b.pdf **Review: Relevant to the Project** *This article shows surveys offering some support for the purpose and need from residents of the Interior Columbia Basin.*
1	**Ruggerio et al. 1994. Viability Analysis in Biological Evaluations: Concepts of Population Viability Analysis, Biological Population, and Ecological Scale. Rocky Mountain Forest and Range Experiment Station. Laramie, Wyoming.** "Considering potential difficulties of using population viability analysis at the project analysis area level (Ruggiero, et. Al., 1994)" http://maps.wildrockies.org/ecosystem_defense/Science_Documents/Ruggerio_et_al_1994.pdf **Review: Relevant to the Project** *The citation consists of peer-reviewed scientific literature exploring a methodology for assessing species viability. Species viability analysis was conducted at the Forest scale as part of the Forest Plan Revision process. However, concepts described in the paper that include forest structure composition, connectivity of habitat,, and species' life history traits are incorporated into the Flint Foothills wildlife analysis where appropriate to help identify effects to species.*
4	**Schneider, Gary "Dead trees (they're still full of life!)" 2008. Macphail Woods Ecological Forestry Project.** "More and more woodlot owners are taking a broader view of their forests. They look for values other than the immediate return on wood harvested. These values include other forest products such as ground hemlock and mushrooms; carbon storage; water purification; leaving a legacy for their children; and healthy wildlife populations. Wildlife trees (dead or dying trees used for nesting, feeding, denning and roosting) go through several stages that can start with ants tunneling into the rotting centre to flycatchers perching on the bare branches. For cavity-nesting birds they are critical habitat. Some species excavate cavities for their nests, while others take over and enlarge existing holes. Many of these birds in turn help the forest, eating insects which can damage trees." http://www.macphailwoods.org/wildlife/deadtrees.html **Review: Not Relevant to the Project** *The reference consists of a webpage summary of the ecological benefits of snags to wildlife species occurring on Prince Edward Island, Canada.*

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	The contents of the bulletin have little applicability to the wildlife analysis conducted for the Flint Foothills Project due to a lack of cited science sources, lack of species-specific information, and differences in habitats associated with Prince Edward Island.
4	**Schowalter, Tim Ph.D., "Insect epidemics a natural path to forest health?" 27-May-1997, *OSU News*.** "Research has already shown that insects are a key in cycling nutrients, speeding decomposition and building soil fertility. It now appears they do far more than that. It's becoming clear that major insect attacks are a powerful tool to shape the very species and structure of forests into one that's appropriate for the terrain and climate – and one that's sustainable. In Oregon we've viewed the major insect epidemics simply as disasters. In fact, those destructive outbreaks are having an effect that's roughly comparable to fire. In some ways they're doing the forest underthinning that fire would have done and we should have done." Defoliating and sap-sucking insects affect nutrient turnover. Wood boring insects penetrate bark and provide access for decomposers and water, accelerating decomposition. Outbreaks can open holes in the forest canopy. The surviving trees get a nutrient burst to improve their growth and health. Something has to establish a balance between the available water, nutrients and the demands of plants. We finally came to realize that fire was a big part of that. Now we need to change our view of insects, because they too play a major role." http://oregonstate.edu/dept/ncs/newsarch/1997/May97/goodbugs.htm **Review: Not Relevant to the Project** *The link provided did not access the referenced paper. However, reading the excerpts provided, this project does not view the insect epidemic and/or endemic populations as a disaster.*
4	**Schwartz, Chuck Ph.D. – March 1998. "Wildlife and Roads" The Interagency Forest Ecology Study Team (INFEST) newsletter.** "The consequences of road construction to wildlife are generally negative. Roads result in increased human access, habitat fragmentation, disturbance, and in some cases direct mortality due to vehicle collisions." "Research has documented an 80% decline in grizzly bear habitat use within 1 km of open roads used by motorized vehicles in Montana9. This has been ascribed either to bears avoiding humans or to the selective over-harvest of bears habituated to humans that would otherwise more fully use areas heavily influenced by people." http://www.sf.adfg.state.ak.us/sarr/forestecology/fsroads.cfm **Review: Relevant to the Project** *Relevant to this project. Roads (and motorized trails) have been recognized to affect wildlife use in an area. As a result, the Forest Plan includes goals, objectives and standards to provide wildlife secure areas.*

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4	**Science Blog. 2001. David Stauth and Tim Showalter.** **Review: Not Relevant to the Project** *The reference appears to be a press release from Oregon State University about a report that could not be found, rather than a scientifically relevant document. From press release, the discussion focuses on Pacific Northwest forests, and speaks to the benefits of insects to thinning forests, with one statement saying "insects are usually helpful to the forest and rarely cause large epidemics". The current mountain pine beetle epidemic is not thinning the forests, rather is affecting 100 percent cent of the 5 inch and larger lodgepole pine stands over the project area (refer to the EA, Vegetation analysis). At endemic levels, the insect activity acts as the article indicates – the project area is part of a larger epidemic of mountain pine beetle.*
4	**Science Buzz. 2007. "Rising from the ashes: Forest fires give way to new growth" May.** (supported by the National Science Foundation) "As a rule of thumb, timber experts say that any particular chunk of ground in the forest should be touched by intense fire every 50 to 100 years. But the power of the fire is just the first step in forest regrowth. Weather patterns in the affected area over the nest year will play a big role in how the new forests develop. A summer of drought could kill the newly released seeds and short-circuit any new growth. That could give new species of trees a chance to grow in the area. Normal rains mixed with the nutrients left on the ground from the fire could be a great booster shot to getting the seeds off to a flying start. Other natural benefits can be seen from fires. For instance, the once-rare black-backed woodpecker is now a regular site in the BWCA with the abundance of dead trees from recent smaller fires and the 1999 wind blow down of trees. New shrubs and ground vegetation is appealing to different kinds of wildlife to snack on." http://www.sciencebuzz.org/blog/rising_from_the_ashes_forest_fires_give_way_to_new_growth **Review: Not Relevant to the Project** *The link is to a blog about post-fire effects on the Superior National Forest in Minnesota. This project takes place in southwestern Montana, and does not propose any activities in post-fire affected areas.*
4	**Shahid Naeem, Chair, F.S. Chapin III, Robert Costanza, Paul R. Ehrlich, Frank B. Golley, David U. Hooper, J.H. Lawton, Robert V. O'Neill, Harold A. Mooney, Osvaldo E. Sala, Amy J. Symstad, and David Tilman. 1999. "Biodiversity and Ecosystem Functioning: Maintaining Natural Life Support Processes." Ecological Society of America, Issues in Ecology, Issue 4.** **Review: Relevant to the Project** *The article referenced explores the link between biodiversity and ecosystem function, and the fact that much more research needs to be done. Loss of species is detrimental to ecosystem function, though research to date has not identified predictive impacts or effects of losing any particular*

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	species on ecosystem process. The project analysis recognizes ecosystem process with natural disturbance regimes that operate within the analysis area, and the potential loss of species such as ponderosa pine and whitebark pine in the absence of the effects of naturally occurring fires; the potential loss of these two species can be contributed to the current MPB epidemic, coupled with increased stand densities of fir species with the absence of fire over the past century, and additionally with whitebark pine, the effects of white pine blister rust.
4	**Shanley, James B. and BeverleyWemple Ph.D. "Water Quantity and Quality in the Mountain Environment" Vermont Law Review, Vol. 26:717, 2002** "The effects of forest roads on hydrology are related to the effects of forest clearing. Most logging requires road access, and the roads often remain after the logging, so there are both short and long-term effects.94 Forest road surfaces are relatively impermeable. Water readily runs over the road surface and associated roadside ditches, often directly to a stream channel, with the net effect of extending channel networks and increasing drainage density.95 In addition to providing conduits for overland flow, forest roads involve slope-cuts and ditching that may intersect the water table and interrupt natural subsurface water movement.96 This diversion of subsurface water may be quantitatively more important than the overland flow of storm water in some watersheds.97 The importance of roads in altering basin hydrology has been underscored in paired-watershed studies and recent modeling studies.98 " (Pgs. 730 and 731) http://www.uvm.edu/~bwemple/pubs/shanley_wemple_law.pdf **Review: Relevant to the Project** *This peer-reviewed journal article looks at water quality and quantity in northeastern USA mountain environments. It is not a study, but a literature review. The mountain stream is an integrator of processes and activities occurring within the stream's watershed. This means that the condition of the stream at a given point reflects the net effects of all activities upstream. A stream reach may be degraded as a result of disturbance upstream even when the adjacent watershed is healthy. Too much disturbance in the watershed of a stream can destabilize the stream. The concepts outlined in this article apply to the Flint Foothills project.*
4	**Short, Brant, Ph.D. and Dayle C. Hardy-Short Ph.D. "Physicians of the Forest": A Rhetorical Critique of the Bush Healthy Forest Initiative" Electronic Green Journal, Issue #19, December 2003.** "Within this volatile atmosphere the Bush Administration presented a new proposal for fire prevention called the "Healthy Forest Initiative." The plan received wide coverage in the national media in August and September 2002 and continues to be at the center of an attempt to significantly shift public land management in the United States. At the core of the plan is an effort to create private sector incentives to promote logging/thinning projects in the national forests." http://escholarship.org/uc/item/4288f8j5 **Review: Not Relevant to the Project** *Not relevant to this project because this is an opinion piece, not a peer reviewed research paper.*

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4	**Sierra Club. 2005. "Ending Commercial Logging on Public Lands"** "Logging on the National Forests provides less than 5% of the nation's timber supply, but costs the taxpayers more than 1 billion dollars in subsidies every year. Nor is logging a good job provider compared to recreation, which by Forest Service estimates provides over 30 times the economic benefits of logging. These forests are the last remnants of the virgin forests that covered the country, and now have far more value as forest ecosystems, watershed/water supply protection, and recreational assets than for logging. In fact, the justification for the Weeks Act in 1911 which established national forests in the east, was watershed protection. (A major barrier to the Forest Service changing its ways is that these increased recreational economic benefits flow into the local economy, not to the Forest Service itself, whereas extractive uses of the national forests contribute directly to Forest Service budgets.) "Our nation is engaged in a great debate over the real purpose of our national forests, with the weight of public opinion swinging more and more strongly toward preservation. Certainly this nation should not be subsidizing logging when it is clear that we understand so little about the functioning of these enormously complex and ancient forest ecosystems that provide millions of people with clean air and water, as well as homes for a myriad of plants and wildlife that can live nowhere else." http://northcarolina.sierraclub.org/pisgah/conservation/ecl.html **Review: Not Relevant to the Project** *This is a perspective piece. It is not relevant to the project.*
4	**Smith, Jane Kapler, ed. "Wildland Fire in Ecosystems: Effects of Fire on Fauna" USDA Forest Service Rocky Mountain Research Station. General Technical Report RMRS-GTR-42-volume 1. January 2000.** "Species that breed exclusively in the first 30 years after fire may be difficult to maintain in the ecosystem without fire. Fire exclusion and post-fire salvage of dead trees after fire may reduce populations of these species over large geographic areas." http://nps.gov/fire/download/fir_eco_wildlandfireJan2000.pdf **Review: Relevant to the Project** *The reference consists of a peer-reviewed science paper that reviews the effects of fire on wildlife. Portions of the paper would be useful in supporting analysis of effects to species as a result of prescribed fire treatments proposed under the Flint Foothills Project.*
4	**Smith, Ted. 1996. "Chief's Ecosystem Stewardship Conference Workshop Review" Eco-Watch, February 26, 1996** "In 1994 Chief Jack Ward Thomas of the U.S. Forest Service invited private foundations to join the USFS and other federal resource management agencies in co-funding a national workshop designed to bring the best science, broadly defined, to an 11-day workshop of agency natural resource managers.1 Having a science background himself, Thomas wanted to capture the scientific underpinnings of ecosystem dynamics in order to establish a more solid basis for sustainable resource management. Private foundations, invited for the first time to join the Forest Service in this way, would, Thomas felt, add legitimacy and assist in bringing in scientific talent from outside the government."

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	http://www.fs.fed.us/eco/eco-watch/ew960226.htm **Review: Not Relevant to the Project** *This excerpt is from a commentary on the 11-day workshop the author participated in that was hosted by then Chief Thomas. The group tackled integrating scientific knowledge into "managing the resource base for a public that is distinguished mainly for giving mixed signals." The article has no direct relevancy to the Flint Foothills Vegetation Management Project, though illustrates the complexity of managing natural resources.*
4	**Stahl, Andy. "Reducing the Threat of Catastrophic Wildfire to Central Oregon Communities and the Surrounding Environment." Testimony before the House Committee on Resources, August 25, 2003** "In sum, 100 years of fire suppression and logging have created conditions that threaten central Oregon's natural resources and communities." "Thus it is inexplicable that the solution proposed by President Bush and some members of Congress emphasizes fire suppression and commercial logging, the very practices that created today's crisis. The federal government continues to attempt to suppress over 99% of all wildland fires. The Forest Service continues to measure its success not in terms of ecosystems restored, but in fires put out. The President's Healthy Forest Initiative, as embodied in H.R. 1904, promotes commercial logging at the expense of citizen participation and oversight of the forests we own." http://www.fseee.org/stay-informed/our-online-library/congressionaltestimony/44-reducing-the-threat-of-catastrophic-wildfire-to-central-oregon-communities-and-the-surrounding-environment **Review: Not Relevant to the Project** *This is an opinion piece, not a peer reviewed research paper.*
1	**Squires, J. and L. Ruggiero. 1995. Winter movements of adult northern goshawks that nested in southcentral Wyoming. J. Raptor Research 29:5-9.** **http://elibrary.unm.edu/sora/jrr/v029n01/p00005-p00009.pdf** as related to letter 1, comment 35; additional literature to address **Review: Relevant to the Project** *This peer-reviewed science paper documents northern goshawk winter movements and habitat use in southern Wyoming, the results of which are included in the Flint Foothills wildlife analysis.*
4	**Strickler, Karyn and Timothy G. Hermach, "Liar, Liar, Forests on Fire: Why Forest Management Exacerbates Loss of Lives and Property" Published by CommonDreams.org, October 31, 2003.** "Fire, just like insects and disease, are a natural and beneficial part of forest ecosystems and watersheds. Without these natural processes the forest ecosystems quickly degrade. Excessive logging removes and reduces cooling shade adding to the hotter, drier forests along with logging debris creating a more flammable forest. Current "forest management" practices, road building and development cause forest fires to rage for

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	hundreds of miles. The Sierra Nevada Ecosystem Project said in a report to the U.S. Congress that timber harvests have increased fire severity more than any other recent human activity. Logging, especially clear cutting, can change the fire climate so that fires start more easily, spread faster, further, and burn hotter causing much more devastation than a fire ignited and burned under natural conditions. If we stop the logging and stop building fire prone developments, we minimize the loss of lives and property suffered by people in fires. As long as the people of America let politicians, timber executives, and the Forest Service get away with it – it will not stop. Those corporations that profit will continue to lie, cheat and steal to continue to make more money from our losses. Just like big tobacco." http://www.commondreams.org/scriptfiles/views03/1031-10.htm **Review: Not Relevant to the Project** *This is an opinion piece, not a peer reviewed research paper.*
4	**Swift Jr., L. W. "Soil losses from roadbeds and cut and fill slopes in the Southern Appalachian Mountains." Southern Journal of Applied Forestry 8: 209-216. 1984.** "Roads are often the major source of soil erosion from forested lands (Patric 1976)." "Generally, soil loss is greatest during and immediately after construction." http://cwt33.ecology.uga.edu/publications/403.pdf **Review: Relevant to the Project** *This peer-reviewed journal article looks at some of the effects of roads on soil losses and erosion, and suggests mitigations to avoid soil loss. This study shows that the cut and fill slopes of roads are a significant sediment source that can be reduced by early establishment of vegetation or by BMPs to control storm flows. Also, gravel surfacing was found to be effective at reducing sediment. BMPs will be used in this project that are designed to reduce sediment from roads, and these can be found in the project hydrology report or in the DEIS.*
4	**Switalski, Adam. "Where Have All the Songbirds Gone? Roads, Fragmentation, and the Decline of Neotropical Migratory Songbirds" Wildlands CPR, September 8, 2003.** "More subtle causes of habitat loss include the construction of roads and power lines. These linear barriers also have been correlated with a decline in neotropical migrant songbirds (Berkey 1993; Boren et al. 1999; Ortega and Capen 2002). Whether by forest conversion or the construction of roads and power lines, fragmentation subdivides habitat into smaller and smaller parcels. The result is an increase of edge habitat, or the boundary between intact forest and surrounding impacted areas. Small forests with large amounts of edge habitat are a hostile landscape for nesting neotropical migratory songbirds. In these areas, songbirds face two great threats: 1) the loss of eggs and nestlings to predators and, 4) parasitism by cowbirds." http://www.wildlandscpr.org/node/213

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	Review: Relevant to the Project *This paper summarizes results from select published articles. The paragraph quoted above deals with forest conversion, roads and powerlines and effects of fragmentation. See response to Al-jabber (2003) reference.*
4	**Tanner, G.W. Ph.D., W.R. Marion Ph.D., and J.J. Mullahey Ph.D. "Understanding Fire: Nature's Land Management Tool" A Florida Cooperative Extension Service publication, July, 1991.** "Ecological benefits of fire: Promotes flowering of herbaceous species and fruit production of woody species. Improves nutritional quality of plants for both wild and domestic animals. Enhances nutrient cycling of some elements and elevates soil pH. Maintains required habitat conditions for fire-adapted plant and animal species. Results in a more heterogenous and diverse habitat–if natural fires are patchy–leaving pockets of unburned areas. Prohibits wildfire conditions from developing (i.e., vast accumulation of highly-flammable, dead vegetation.)" http://edis.ifas.ufl.edu/UW124 **Review: Relevant to the Project** *We agree.*
4	**Taxpayers for Common Sense. "From the Ashes: Reducing the Harmful Effects and Rising Costs of Western Wildfires." Washington DC , Dec. 2000** "The agency's commercial timber program can contribute to the risk and severity of wildfire in the National Forests, yet Congress devotes nearly one-third of the Forest Service's entire budget to this wasteful program." (pg. 1) "Do not utilize the commercial timber program to reduce the risk of fire. Commercial incentives undercut forest health objectives and can actually increase the risk of fire." (pg. 9) "Commercial logging, especially of larger, fire-resistant trees, in the National Forests is one of several factors contributing to the risk and severity of wildfire." (pg. 19) "Commercial logging and logging roads open the forest canopy, which can have two effects. First, it allows direct sunlight to reach the forest floor, leading to increased evaporation and drier forests.5 As a consequence, ground fuels (grass, leaves, needles, twigs, etc.) dry out more quickly and become susceptible to fire. Second, an open canopy allows more sunlight to reach the understory trees, increasing their growth.6 This can lead to weaker, more densely-packed forests." (pgs. 19-20) "Congress and the Forest Service continue to rely on the commercial logging program to do something it will never accomplish – reduce fire risk.

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	The commercial logging program is designed to provide trees to private timber companies, not to reduce the risk of fire." (pg. 20) http://www.ourforests.org/fact/ashes.pdf **Review: Not Relevant to the Project** *This paper calls for Congressional reforms to "reduce the harmful effects and the escalating cost of Western wildfires." The citations reference the effects of logging on wildfire risk reduction. The purpose and need for the Flint Foothills Vegetation Management Project does not include a reduction in fire risk or severity.*
4	**The Ecology Center, Inc., v. United States Forest Service United States Court of Appeals, Tenth Circuit, June 29, 2006** **An Appeal from the United States District Court for the District of Utah (D.C. No. 4:03-CV-589-TS)** http://www.ca10.uscourts.gov/opinions/05/05-4101.pdf **Review: Not Relevant to the Project** *The lawsuit involves the Griffin Springs Resources Management Project on the Dixie National Forest and whether the analysis considered the best available science in managing for the northern goshawk. The Forest Plan incorporates the requirements of the Utah Northern Goshawk Conservation Strategy and Agreement for the Management of Northern Goshawk Habitat in Utah (the "Conservation Strategy"); the Conservation Strategy states that the Forest Service report, Management Recommendations for the Northern Goshawk in the Southwestern United States (the "Reynolds Report') is considered the best available science on managing the northern goshawk. The project was developed under the 1986 Dixie National Forest Plan, which was developed under the 1982 planning rule. After the EIS was completed the Forest Service looked at other data in managing the northern goshawk and issued a Supplemental EIS that considered these studies. The Record of Decision for the project was signed in 2003. The Forest Service and the court acknowledged that the transition provision of the 2000 transition planning rule applied to the project. Under these regulations, the Forest service was required to consider the "best available science" when implementing site-specific project under the forest plan. In the record of decision for the Griffin Springs project, there was no mention of the 2000 transition rule; and the court was unable to determine whether the "Forest Service's reliance on other available data satisfies the "best available science" requirements." The Flint Foothills Vegetation Management Project is guided by the Forest Plan for the Beaverhead-Deerlodge Forest, which was developed under the transition provisions of the 2000 planning rule, which allows continued use of the 1982 rule procedures for revisions and amendments. The analysis for the Flint Foothills Project adheres to the "best available science" requirements.*
4	**The Wilderness Society. 2003. "Dead Trees and Healthy Forests: Is Fire Always Bad?" March 2003.** "Forested landscapes may be thought of as living "crazy quilts," with patches formed occasionally through the action of natural and human-caused disturbances like fire, windstorms, and logging. Prior to the advent of modern logging technology, virtually every North American forest experienced occasional renewal through the action of fire. In some places, fire was a frequent visitor, killing very few large trees as it burned harmlessly through the forest litter and grass. In most places, though, fire burned only occasionally, creating patches of severely burned forest as it raced through the canopy under extreme weather conditions. In these patches, old forests were killed, soon to be replaced by young, rejuvenated stands. This cycle

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	of forest maturation, death, and replacement was critical to maintaining the diversity and vitality of the ecosystem.” http://www.wildfirelessons.net/documents/Dead-Trees-and-Healthy-Forests.pdf **Review: Not Relevant to the Project** *The policy brief is a short discussion on fire effects, with the key points being: fire and other disturbances are essential processes; thinning is not appropriate in all forest types; dead trees are a natural part of a healthy ecosystem; and salvage logging is not necessary to prevent future fire. The project analysis in agrees with all of the key points; however, the policy brief is not a peer-reviewed, scientifically-based citation.*
1	**Thomas, A. G. & Dale, H. M. (1975). “The role of seed reproduction in the dynamics of established populations of *Hieracium floribundum* and a comparison with that of vegetative reproduction.” Canadian Journal of Botany, 53, 3022-3031.** “Yellow and Orange Hawkweed – These species can persist in shaded conditions and often grow underneath shrubs making eradication very difficult. Their stoloniferous (growing at the surface or below ground) habit can create dense mats that can persist and spread to densities of 3500 plants per square mile (Thomas and Dale 1975).” **Review: Not Relevant to the Project** *This paper further investigates the role of seed reproduction in the establishment of hawkweed and compares it to vegetative reproduction. Hawkweed was not located within the project area during the 2011 invasive species mapping effort.*
4	**Thomas, Craig. “Living with risk: Homeowners face the responsibility and challenge of developing defenses against wildfires.” *Sacramento Bee* newspaper, July 1, 2007.** “Indiscriminate logging is not a viable solution to reducing wildfire risk. Logging can actually increase fire danger by leaving flammable debris on the forest floor. Loss of tree canopy lets the sun in, encouraging the growth of brush, increases wind speed and air temperature, and decreases the humidity in the forest, making fire conditions even worse.” http://www.sierraforestlegacy.org/NR_InTheNews/SFLIP_2007-07-01_SacramentoBee.php **Review: Not Relevant to the Project** *This is an opinion piece, not a peer reviewed research paper.*
4	**Thomas, Jack Ward Ph.D., US Forest Service Chief. “Dead Wood: From Forester’s Bane to Environmental Boon”. Keynote address at the symposium on ecology and management of deadwood in western forests, Reno, Nevada. 1999.** “In retrospect, it is amazing that forest managers did not realize that dead wood was a critical habitat component for vertebrate and invertebrate wildlife and for the forest itself.” http://www.fs.fed.us/psw/publications/documents/gtr-181/003_Thomas.pdf

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	Review: Relevant to the Project *The DEIS recognizes that snags and downed logs are important to wildlife and addresses the effects of project activities on these habitat components.*
1	**Thorpe, Andrea S, Vince Archer, and Thomas H. DeLuca. 2006. The invasive forb, Centaurea maculosa, increases phosphorus availability in Montana grasslands. Applied Soil Ecology 32: 118–122.** **http://appliedeco.org/about-us/staff/andrea-s-thorpe-ph-d-1/Thorpe%20et%20al%202006_centaurea%20and%20phosphorus.pdf** As related to letter 1, comment 35; additional literature to address **Review: Relevant to the Project** *This paper is relevant to the Flint Foothills project as Centaurea maculosa is present in the project area along roads and in rangeland. Thorpe et al. (2006) performed several experiments to test the soil phosphorous (P) level in grasslands invaded by Centaurea maculosa Lam. (Asteraceae, spotted knapweed) as well as the efficiency of spotted knapweed both in the field and the greenhouse. While not tested directly, it has been suggested that spotted knapweed is able to outcompete native species for soil P. Results from this study show that while spotted knapweed has the ability to acquire more P than native species, its ability to acquire P was not related to a depletion in the soil P. Experiments by Thorpe et al. (2006) suggest that while P uptake by native plants does not change from uninvaded to invaded sites, spotted knapweed utilizes P more efficiently than native plants leading to increased biomass.* *Spotted knapweed is present in the project area; therefore, the potential for impacts to soil productivity exists as a result of noxious weed infestation. However, the actual impact to long term soil productivity is likely minimal, due to the following:* *The Invasive Plant resource report describes a low risk of noxious weeds becoming established and/or spreading in proposed treatment units within the analysis area.* *The mitigation measures listed in the DEIS include monitoring for and treating noxious weeds within units and along roads.* *Treatment of noxious weeds with herbicides on the Beaverhead-Deerlodge NF has been effective (infested acres reduced by 49% over the last ten years on the Pintler Ranger District) (Rasor 2012).*
4	**Tidwell, Tom. USFS Chief. 2009. Statement from an interview with Rob Chaney of the *Missoulian,* June 19, 2009.** "We have some of the best science, and we need to make sure we're applying that, using that and sharing that as we move forward. I think we have a key leadership role, not only in the application of science but to help inform and educate our community and the folks we work with." http://westinstenv.org/sosf/2009/06/19/tidwell-interviewed-by-the-missoulian/ **Review: Not Relevant to the Project** *The excerpt is from an interview that touched on a variety of topics, including focused areas of watershed management and climate change, not*

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	directly referencing the Flint Foothills Vegetation Management Project. Chief Tidwell remarked that the Forest Service has a leadership role with respect to climate change, as stated in the excerpt provided. The Flint Foothills project analysis considers the relevant, latest and best science available; over 100 references are cited in the analyses.
4	**Trombulak, Stephen C. Ph.D. and Christopher A. Frissell Ph.D. "Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities" Conservation Biology, Volume 14, No. 1, Pages 18–30, February 2000.** "Roads are a widespread and increasing feature of most landscapes. We reviewed the scientific literature on the ecological effects of roads and found support for the general conclusion that they are associated with negative effects on biotic integrity in both terrestrial and aquatic ecosystems. Roads of all kinds have seven general effects: mortality from road construction, mortality from collision with vehicles, modification of animal behavior, alteration of the physical environment, alteration of the chemical environment, spread of exotics, and increased use of areas by humans. Road construction kills sessile and slow-moving organisms, injures organisms adjacent to a road, and alters physical conditions beneath a road. Vehicle collisions affect the demography of many species, both vertebrates and invertebrates; mitigation measures to reduce roadkill have been only partly successful. Roads alter animal behavior by causing changes in home ranges, movement, reproductive success, escape response, and physiological state. Roads change soil density, temperature, soil water content, light levels, dust, surface waters, patterns of runoff, and sedimentation, as well as adding heavy metals (especially lead), salts, organic molecules, ozone, and nutrients to roadside environments. Roads promote the dispersal of exotic species by altering habitats, stressing native species, and providing movement corridors. Roads also promote increased hunting, fishing, passive harassment of animals, and landscape modifications. Not all species and ecosystems are equally affected by roads, but overall the presence of roads is highly correlated with changes in species composition, population sizes, and hydrologic and geomorphic processes that shape aquatic and riparian systems. More experimental research is needed to complement post-hoc correlative studies. Our review underscores the importance to conservation of avoiding construction of new roads in roadless or sparsely roaded areas and of removal or restoration of existing roads to benefit both terrestrial and aquatic biota." http://www.transwildalliance.org/resources/200922144524.pdf **Review: Relevant to the Project** *The citation is a general synthesis of some of the deleterious effects of roads on the natural environment reported by peer-reviewed science publications. It is very broad based and contains some concepts that are addressed in the Flint Foothills wildlife analysis. Analysis of roads and their effects to aquatic species is discussed in the EIS.*
1	**USDA. 1998. Deer Creeks Prescribed Burn Proposal and Predicted Effects on Upland Game birds. October 13, 1998. Gallatin National Forest, Big Timber Ranger District.** As related to letter 1, comment 35; additional literature to address **Review: Not Relevant to the Project** *The reference document could not be located and, therefore, could not be reviewed and assessed as additional literature to address.*

Letter Number	Literature
1	**USDA. 1998. Deer Creeks Prescribed Burn Proposal and Predicted Effects on Deer, Elk and Antelope. October 13, 1998. Gallatin National Forest, Big Timber Ranger District.** As related to letter 1, comment 35; additional literature to address **Review: Not Relevant to the Project** *The reference document could not be located and, therefore, could not be reviewed and assessed as additional literature to address.*
1	**USDA. 1998. Deer Creek Prescribed Burn Proposal, Effects on Neotropical Migratory Birds. October 13, 1998. Gallatin National Forest, Big Timber Ranger District.** As related to letter 1, comment 35; additional literature to address **Review: Not Relevant to the Project** *The reference document could not be located and, therefore, could not be reviewed and assessed as additional literature to address.*
1	**USDA. 2000. Expert interview summary for the Black Hills National Forest Land and Resource Management Plan amendment. USDA Forest Service. Black Hills National Forest. Custer South Dakota.** http://maps.wildrockies.org/ecosystem_defense/Federal_Agencies/Forest_Service/Region_2/Black_Hills_Expert_Interview_Sum.pdf As related to letter 1, comment 35; additional literature to address **Response: Relevant to the Project.** *This will be incorporated into the Botany Report/BE. The suggested reading is a review process conducted by the Black Hills National Forest for Forest Plan Amendment. The Forest utilized outside experts to gather information pertaining to Forest sensitive species that would help them in the Forest Plan Amendment process. One species is shared between the Black Hills sensitive plant list and the Beaverhead-Deerlodge sensitive plant list (Epipactis 254igantean), and two genera are shared (Carex and Botrychium).* *Though the reading really pertains to Forest Plan Amendment and incorporating long term management decisions for sensitive plants, there were several useful points brought up by the experts that could be addressed in a project specific EA and include:* *-Botrychium detection during surveys is difficult and taxonomic questions are present* *-timber harvest within Botrychium habitat could impact Botrychium species of activities occur where plants occur* *-weed control can benefit sensitive plant species, but the control methods can be harmful (broadcast spraying)* *-invasion of exotic species is a long term impact to sensitive plant species* *-noxious weed control activities are a short term impact*

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	Long term management decisions mentioned during the interview that are more appropriate for Forest Planning, but are not appropriate for incorporation into a project specific EA include: *-the creation of several "standards" and "guidelines." The Beaverhead-Deerlodge has the following Forest Plan Goal: Sensitive plant populations and their habitat are maintained or restored.* *Large core populations or fringe-of-range populations of sensitive plants are conserved in research natural areas, botanical special interest areas, or protected as populations in conservation strategies, or project design specifications (Scale – Populations).* *-the creation of "conservation areas" or buffers for sensitive plant protection in the Forest Plan* *-comprehensive surveys across the forest (not project specific). This has been discussed on the Beaverhead-Deerlodge, but money is currently the limiting factor, as there is support for the Rocky Mountain Herbarium to conduct such surveys* *-developing a monitoring program of sensitive plant species. The Beaverhead-Deerlodge, under Forest Plan direction has begun monitoring of the G1-G3 sensitive plant species, which includes 15 sensitive plant species.* *The reference consists of the comments of taxa experts interviewed to assess the LRMP amendment for the Black Hills National Forest. While most information pertains specifically to the Black Hills, some species-specific information provided by the panel can be used to help identify habitat requirements and potential management effects to several species analyzed in the Flint Foothills Project.*
1	**USDA Forest Service. 2005a. "Sheep Creek Fire Salvage Project Final Environmental Impact Statement." Beaverhead-Deerlodge National Forest.** "The Sheep Creek Salvage FEIS (USDA Forest Service, 2005a) states at p. 173: Noxious weed presence may lead to physical and biological changes in soil. Organic matter distribution and nutrient flux may change dramatically with noxious weed invasion. Spotted knapweed (*Centaurea biebersteinii* D.C.) impacts phosphorus levels at sites (LeJeune and Seastedt, 2001) and can hinder growth of other species with allelopathic mechanism. Specific to spotted knapweed, these traits can ultimately limit native species' ability to compete and can have direct impacts on species diversity (Tyser and Key 1988, Ridenour and Callaway 2001)." **Review: Relevant to the Project** *The EIS cited was completed for the Sheep Creek fire salvage project on the Wisdom Ranger District. Although the research papers address spotted knapweed effects in grassland plant communities (versus forested communities), the papers cited in the EIS are still relevant to the Flint Foothills project. LeJeune and Seastedt (2001) reviewed the literature along with their own unpublished data and state that based on preliminary evidence, it appears that knapweed is a strong competitor for phosphorous and water, and is able to do well in grasslands once limited by nitrogen. Nitrogen is no longer a limiting resource due to increased anthropogenic disturbances over the past century, which has made nitrogen more available (through reduced fire frequency, atmospheric deposition of nitrogen, and possibly direct and indirect fertilization from grazing). Phosphorous and water are the new limiting resources and knapweed does well in competing for them. Tyser and Key (1988) performed a study in Glacier National Park and found spotted knapweed could invade native fescue grasslands. Further, they found an inverse relationship between knapweed stem density and species richness and frequency of several species, and concluded that knapweed has the ability to alter plant*

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	community composition. Ridenour and Calloway (2001) performed a greenhouse study to determine the allelopathic affects that spotted knapweed has on Idaho fescue. They found that spotted knapweed reduces Idaho fescue growth primarily through allelopathy but also through resource competition (nutrients, space, water). We agree that noxious weeds have the potential to affect soil productivity; however, the effects of weeds on soil productivity are very minimal due to limited weed presence along roadsides (not productive soils) and ongoing weed treatments in accordance with the Beaverhead-Deerlodge National Forest Noxious Weed Control Record of Decision (USDA Forest Service 2002). The forestwide noxious weed situation is discussed in the Beaverhead-Deerlodge National Forest Noxious Weed Control FEIS (USDA Forest Service 2002). In short, soil quality indicators are "normal" in infestations that have been treated successfully. On weed-dominated sites that have not been treated or where treatment has not been very effective, "organic matter is lower and structure in the surface soil may have been altered. Erosion rates appear to have increased in some cases."
1	**USDA Forest Service. 2007. "Sagebrush in western North America: habitats and species in jeopardy." Pacific Northwest Research Station. March, 2007** **http://www.fs.fed.us/pnw/sciencef/scifi91.pdf** As related to letter 1, comment 35; additional literature to address **Review: Not Relevant to the Project** *There is no sagebrush in the Flint Foothills Project area*
4	**USDA Forest Service. "Forest Management: A Historical Perspective."** "During the post-World War II housing boom, national forests were viewed as a ready supply of building material. The increased demand for timber from national forests led to widespread use of commodity-oriented harvesting techniques such clearcutting. Along with the increased logging that followed, concern over the environment increased. In the 1960's and 1970's, several laws were enacted to protect forests. Additional laws formalized the concept of "multiple-use," whereby the uses of timber, forage, and water shared equal footing with wildlife conservation and recreation opportunities." http://www.fs.fed.us/forestmanagement/aboutus/histperspective.shtml **Review: Not Relevant to the Project** *This website assembles commonly understood historical information; it does not provide anything directly applicable in this project.*
4	**University of California; SNEP Science Team and Special Consultants 1996. "Sierra Nevada Ecosystem Project: Final Report to Congress." Volume 1, Chapter 4 – Fire and Fuels.** "Timber harvest, through its effects on forest structure, local microclimate, and fuels accumulation, has increased fire severity more than any other recent human activity."(pg.62) http://ceres.ca.gov/snep/pubs/web/PDF/v1_ch04.pdf

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	Review: Not Relevant to the Project *On the same page of the report it also states that silvicultural treatments can mimic the effects of fire on structural patterns of woody vegetation, and that climatic variation plays an important role in influencing fire patterns and severity. Slash created through harvest activities would be mitigated through whole tree yarding at central landing sites for disposal.*
1	**USDA Forest Service. Lewis and Clark NF, Dry Fork EA Appendix D at p. 9** "Population viability analysis is not plausible or logical at the project level such as the scale of the Dry Fork Vegetation and Recreation Restoration EA. Distributions of common wildlife species as well as species at risk encompass much larger areas than typical project areas and in most cases larger than National Forest boundaries. No wildlife species that presently occupy the project area are at such low numbers that potential effects to individuals would jeopardize species viability. No actions proposed under the preferred alternative would conceivably lead to loss of population viability. (Lewis and Clark NF, Dry Fork EA Appendix D at p. 9.)" http://www.fs.fed.us/r1/lewisclark/projects/dryfork_web/ **Review: Not Relevant to the Project** *The reference document could not be located and, therefore, could not be reviewed and assessed as additional literature to address.*
4	**USDI Fish and Wildlife Service. Regulations and Policies. MBTA. List of Migratory Birds** Using the link to the bird species protected under the Migratory Bird Treaty Act please indicate in the EA the bird species that exist in the project area or have habitat in the project area. http://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/mbtandx.html **Review: Relevant to the Project** *The Flint Foothills Project wildlife analysis addresses migratory birds and provides a list of migratory bird species pertinent to the analysis area and identified by the USFWS as Birds of Conservation Concern.*
4	**Valetkevitch, Heidi. National Media Officer USDA Forest Service, to Joe Bauman, reporter for the *Deseret Morning News* December 24, 2004. (Statement)** "The new rule directs forest managers to use the best science available to protect species at a landscape level. The emphasis is to preserve ecosystems as a whole." http://www.deseretnews.com/article/600100084/New-forest-rules-focus-on-holistic-approach.html **Review: Relevant or Not Relevant to the Project**

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	The "new rule" discussed in this article is the final 2005 planning rule, which provided the framework for the Forest Service in revising land and resource management plans (Forest Plans). It included an Environmental Management System (EMS) to be used during the planning process. Per the excerpt provided by the commenter to the Flint Foothills Vegetation Management Project, the rule also directed forest managers to consider the best available science in making decisions at a landscape level. The Forest Service is currently working under the transition provision of the 1982 planning rule. Under these regulations, the Forest Service is required to consider the "best available science" when implementing site-specific projects within a forest plan. 36 C.F.R. § 219.35(a) (2001). The Flint Foothills Vegetation Management Project considers the latest and best science available—over 100 references are cited in the analyses.
1	**Veblen, T.T. 2003. "Key issues in fire regime research for fuels management and ecological restoration." Pages 259-276 in: P. Omi and L. Joyce (technical eds). *Fire, Fuel Treatments and Ecological Restoration: Conference proceedings*; 2002 16-18 April; Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 475 p.** "Veblen (2003) questions the premises the FS often puts forth to justify "uncharacteristic vegetation patterns" discussions, that being to take management activities to alter vegetation patterns in response to fire suppression." http://www.colorado.edu/geography/biogeography/publications/VeblenFireConfPaper2003.pdf **Review: Relevant to the Project** *The summary quote above from the commenter is not an accurate summary of the alternative; rather, the paper asserts that the limitations of fire history methodology and reliance on summary fire statistics (fire regime research) may result in developing an inappropriate or ineffective management strategy. The caution provided in the paper is that broad generalizations and premises need to be carefully examined for particular ecosystems and management objectives. In other words, "fuels management and ecological restoration need to be attentive to proper place and appropriate time" (Veblen 2003). The project analysis does exactly what the paper recommends, namely using appropriate, current, and to the extent possible Regionally specific research to determine the 'proper place and appropriate time' for the proposed management actions.*
4	**Vernetti, Toni. 2007. "Are You Wildfire Aware?" June 07.** "Wildfires have been a natural part of our environment since time began. Under the right circumstances these wildfires can be beneficial to an ecosystem." "Wildfires consume vegetation that would otherwise become overgrown, creating ideal conditions for a catastrophic wildfire. Wildfires allow more open spaces for new and different kinds of vegetation to grow and receive sunlight. This, in turn, provides fresh nutrients and shelter for forest plants and animals. Wildfires also keep our forests healthy by consuming harmful insects and diseases." http://www.googobits.com/articles/p0-547-are-you-wildfire-aware.html **Review: Not Relevant to the Project** *The article referenced is a very general wildfire awareness educational piece for an independent articles and advice internet site. The article is not a peer-reviewed, scientifically based paper.*

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4	**Vincent, James W. Ph.D., Daniel A. Hagen, Ph.D., Patrick G. Welle Ph.D. and Kole Swanser. 1995. "Passive-Use Values of Public Forestlands: A Survey of the Literature." A study conducted on behalf of the U.S. Forest Service.** "The development of sound forest-management policies requires that consideration be given to the economic benefits associated with competing uses of forest resources. The benefits that may be provided under different management regimes include both use values (such as those provided by timber harvesting and recreation) and passive-use (or nonuse) values, including existence value, option value and quasi-option value. Many of these benefits are not revealed in market transactions, and thus cannot be inferred from conventional data on prices and costs." http://www.icbemp.gov/science/vincent.pdf **Review: Not Relevant to the Project** *This paper is an effort to explain natural resource economics concepts, mainly how to apply non-market valuation techniques. Although non-market economics are mentioned as a consideration in the specialist report, the examples offered here are not relevant to this project as habitat is not expected to be substantially modified and is not at a scale that would harm wildlife populations, nor affect non-market values.*
4	**Voss, René, Ph.D. 2002. "Getting Burned by Logging."** ***The Baltimore Chronicle.*** **July.** "Fire is an essential, natural and necessary part of Western forest ecology. Many species of trees can only reproduce after fires occur. Wildland fires burn underbrush and return important nutrients to the soil." http://www.baltimorechronicle.com/firelies_jul02.shtml **Review: Relevant or Not Relevant to the Project** Response: Relevant to the project. We agree.
4	**Voss, René, Ph.D. 2002. "Getting Burned by Logging."** ***The Baltimore Chronicle.*** **July.** "Unfortunately, there are a number of massive logging proposals, disguised as hazardous fuels treatments that have put environmentalists at odds with the Forest Service. Nearly all of these proposals focus primarily on the removal of mature and old-growth trees. These proposals continue even with overwhelming evidence that commercial logging is more of a problem than a solution. There's simply a cognitive disconnect between the Forest Service's scientists and its timber sale planners, whose budgets are dependent upon selling valuable mature trees. Ironically, this very type of logging, experts inform us, is likely to increase, not decrease, the frequency and severity of wildland fires. In the Forest Service's own National Fire Plan, agency scientists warned against the use of commercial logging to address fire management. The report found that 'the removal of large, merchantable trees from forests does not reduce fire risk and may, in fact, increase such risk.' " http://www.baltimorechronicle.com/firelies_jul02.shtml **Review: Not Relevant to the Project**

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	This quotation is: 1) opinion with no reference to supporting material, 2) general and not specific to the Flint Foothills project; therefore, there is nothing substantive to comment on. The Flint Foothills project is not proposing to thin mature and old-growth trees, please refer to chapter 2 of the EIS for the proposed treatments.
4	**Watson, Mark L. "Habitat Fragmentation and the Effects of Roads on Wildlife and Habitats." Background and Literature Review 2005.** "Roads are a major contributor to habitat fragmentation because they divide large landscapes into smaller patches and convert interior habitat into edge habitat. As additional road construction and timber harvest activities increase habitat fragmentation across large areas, the populations of some species may become isolated, increasing the risk of local extirpations or extinctions (Noss and Cooperrider 1994)." "Habitat fragmentation creates landscapes made of altered habitats or developed areas fundamentally different from those shaped by natural disturbances that species have adapted to over evolutionary time (Noss and Cooperrider 1994 in Meffe et al. 1997). Adverse effects of habitat fragmentation to both wildlife populations and species include: "Increased isolation of populations or species, which leads to: Adverse genetic effects; i.e. inbreeding depression (depressed fertility and fecundity, increased natal mortality) and decreased genetic diversity from genetic drift and bottlenecks, Increased potential for extirpation of localized populations or extinction of narrowly distributed species from catastrophic events such as hurricanes, wildfires or disease outbreaks, Changes in habitat vegetative composition, often to weedy and invasive species, Changes in the type and quality of the food base, Changes in microclimates by altering temperature and moisture regimes, Changes in flows of energy and nutrients, Changes in the availability of cover and increases edge effect, bringing together species that might otherwise not interact, potentially increasing rates of predation, competition and nest parasitism, and Increased opportunities for exploitation by humans, such as poaching or illegal collection for the pet trade." http://www.wildlife.state.nm.us/conservation/habitat_handbook/documents/2004EffectsofRoadsonWildlifeandHabitats.pdf **Review: Relevant to the Project** *This paper includes a list of potential effects of roads and highways. It also includes an appendix with a literature review of road effects to wildlife and habitats, with the literature cited following it. The quoted section above lists potential effects of roads.* *It is recognized that lower-standard, unpaved Forest roads have potential effects. The effects of displacement and avoidance were addressed in the Forest Plan and provides wildlife secure habitat through management of open motorized road and trail densities. This direction is discussed in the Flint Foothills Project wildlife analysis.*
4	**West Arm Watershed Alliance. 2000. "Applying Ecological Principles to Management of the U.S. National Forests" Issues in Ecology**

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	Number 6 Spring 2000 "Timber harvest will remove dead and dying material from the site and inhibit the recruitment of downed woody material as time progresses. Timber harvest and associated r educed structural complexity and reduced age and size class diversity are all known to reduce population abundance and diversity of ants and a number of birds. For instance, ants are documented to require downed woody material in a variety of sizes and in all stages of decomposition (Torgersen and Bull, 1995). This is an attribute that is negatively correlated with harvest of the dead and dying trees and positively correlated with natural succession, especially after disturbance. Ants and birds are known to predate on insect species which cause mortality to trees, serving as a potentially important population control in the case of epidemics or before they occur (Campbell, Torgersen and Srivastava, 1983). Structural and functional characteristics associated with unlogged forests are also important for canopy arthropods, which play an important role in regulating pest outbreaks (Schowalter, 1989). Structural complexity, functional diversity, diversity of ecological process and diversity of structure in roadless areas are all expected to be less susceptible to the outbreak of pests and regulate insect activity in surrounding homogenized forests (Schowalter and Means, 1989; Franklin, Perry, Schowalter, Harmon, McKee and Spies, 1989). A large body of scientific evidence also indicates that increased edge effect and increased sunlight into stands, resulting from reduced canopy cover associated with timber harvest, can directly promote the population abundance, productivity and persistence of insects which cause mortality to trees of (Roland, 1993; Rothman and Roland, 1998; Kouki, McCullough and Marshall, 1997; Bellinger, Ravlin and McManus, 1989)." http://www.watertalk.org/wawa/ecosci.html **Review: Relevant to the Project** *This is a journal article in which the authors describe what they believe are ecological considerations that should be incorporated in sound forest management policy and their potential impacts on current practice. However, it contains no sources, references, or literature cited and is not scientific, peer-reviewed literature. The paper summarizes some potential effects of timber harvest and roads.* *The importance of snags and downed wood was recognized during the development of the Forest Plan and standards were incorporated into the Forest Plan, and the project was designed to retain these habitat components in harvest units and would meet Forest Plan direction.* *Salvage with clearcut activities removing dead and dying material from the site are proposed on about 2 percent of the 44,522-acre project area, or 6 percent of the 18,141 acres identified as lodgepole pine, with 100% of the stands affected by mountain pine beetle. Reduced canopy cover from thinning in Douglas-fir and ponderosa pine stands increases resilience, thus increasing the defensive response to insect attacks and promoting more open-grown stand conditions that favor ponderosa pine. The proposed activities would reduce canopy cover in Douglas-fir-ponderosa pine stands to 40-60 ft2 of basal area per acre on 1,146 acres (3% of the project area) with Alternative 2 and 666 acres (2% of the project area) with Alternative 3.*
4	**West Arm Watershed Alliance. 2000. "Applying Ecological Principles to Management of the U.S. National Forests" Issues in Ecology Number 6 Spring 2000.** "Roads may have unavoidable effects on streams, no matter how well they are located, designed or maintained. The sediment contribution to

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	streams from roads is often much greater than that from all other land management activities combined, including log skidding and yarding.' (Gibbons and Salo 1973). Research by Megahan and Kidd in 1972 found that roads built in areas with highly erosive soils can contribute up to 220 times as much sediment to streams as intact forests." http://www.watertalk.org/wawa/ecosci.html **Review: Relevant to the Project** *This peer-reviewed article looks at forest management and ecology and includes a brief review of some of the sources of sedimentation from forested landscapes. Protection of water quality and yield and prevention of flooding and landslides call for greater attention to the negative impacts of logging roads and the value of undisturbed buffer zones (RCAs) along streams and rivers. This project recognizes the importance of roads as a sediment source to streams, and would use BMPs during project implementation to reduce the effects of roads on sediment yield*
1	**Whisenant, S. 1990. Changing fire frequencies on Idaho's Snake River Plains: ecological and management implications. Page 4-10 in Proceedings – Symposium on cheatgrass invasion, shrub die-off and other aspects of shrub biology and management. USDA Forest Service. Intermountain Research Station. General Technical Report INT-276.** **Review: Relevant to the Project** See previous response on this citation.
4	**Wisdom, Michael J., Richard S. Holthausen Ph.D., Barbara C. Wales Ph.D. Christina D. Hargis Ph.D., Victoria A. Saab Ph.D., Danny C. Lee Ph.D., Wendel J. Hann Ph.D. Terrell D. Rich, Mary M. Rowland, Wally J. Murphy, and Michelle R. Eames "Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-Scale Trends and Management Implications Volume 2 – Group Level Results." USDA Forest Service, PNW-GTR-485, May 2000.** "Our analysis also indicated that >70 percent of the 91 species are affected negatively by one or more factors associated with roads." "Roads in forested areas increase trapping pressures for martens and fishers, resulting in significantly higher captures in roaded versus unroaded areas (Hodgman and others 1994) and in logged versus unlogged areas, in which the difference was again attributed to higher road densities in logged stands (Thompson 1994). Secondary roads also might increase the likelihood that snags and logs will be removed for fuel wood. This could impact fishers, martens and flammulated owls, and also could have a negative effect on the prey base for goshawks (Reynolds and others 1992)." "An additional, indirect effect of roads is that road avoidance leads to underutilization of habitats that are otherwise high quality." http://maps.wildrockies.org/ecosystem_defense/Science_Documents/Wisdom_et_al_2000/Vol_2a.pdf **Review: Relevant or Not Relevant to the Project** *It is recognized that lower-standard, unpaved Forest roads have potential effects. The effects of displacement and avoidance were addressed in the*

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	Forest Plan and provides wildlife secure habitat through management of open motorized road and trail densities. This direction is discussed Flint Foothills wildlife analysis.
4	**Woodford, Riley. 2003. "Regeneration Following Fire Creates Fertile Habitat for Wildlife" *Alaska Fish and Wildlife News*. August.** "People are bombarded with the negative aspects of fire," Paragi said. "You hear terms like 'destroyed thousands of acres of forest,' and the thought of destruction gets embedded in the public mind. But fire is a natural part of the ecosystem and it is actually very important." "Fire opens up the forest canopy and allows sunlight to reach the ground, stimulating the organisms that decompose organic matter and make nutrients available to plants. Fire burns off the insulating layer of moss and duff, allowing sunlight to further warm the soil. The ash can release nutrients back into the soil and change soil chemistry, promoting plants growth." http://www.wildlife.alaska.gov/index.cfm?adfg=wildlife_news.view_article&issue_id=5&articles_id=60 **Review: Not Relevant to the Project** *The reference is a news article for the Alaska Department of Fish and Game website talking about the benefits of fire for wildlife habitat. This is not a peer-reviewed scientifically-based article. Additionally, the project also views fire as a beneficial disturbance.*
4	**Wright, Bronwen, Policy Analyst and Attorney Pacific Rivers Council Excerpt from a May 11, 2009 letter to the Rogue River-Siskiyou National Forest Travel Management Team** "According to the DEIS, the Forest now manages a total of 5,914 miles of roads across the Forest. Scientific literature has established that roads have numerous widespread, pervasive and, if left untreated, long-lasting biological and physical impacts on aquatic ecosystems that continue long after completion of construction. (Angermeier et al. 2004). Roads increase surface water flow, alter runoff patterns, alter streamflow patterns and hydrology, and increase sedimentation and turbidity. Roads are the main source of sediment to water bodies from forestry operations in the United States. (US EPA 2002). Road construction can lead to slope failures, mass wasting and gully erosion. Road crossings can act as barriers to movement for fish and other aquatic organisms, disrupting migration and reducing population viability. (Schlosser and Angermeier 1995). Chemical pollutants that enter streams via runoff, such as salt and lead from road use and management, compound these impacts. Most of these adverse effects are persistent and will not recover or reverse without human intervention. The techniques for road remediation are well established, agreed upon and readily available. (Weaver et al. 2006)" (Pg. 2) http://www.pacificrivers.org/protection-defense/comment-letters/Rogue%20River%20Siskiyou%20TMP%20DEIS.pdf **Review: Not Relevant to the Project** *This non-peer-reviewed article is not relevant to the project. It does mention some of the general effects of roads and lack of road maintenance on turbidity and sedimentation in streams however, it is a response to a travel management plan on the Rogue-Siskiyou National Forest and comments are specific to that forest.*
4	**Wuerthner, George. 2008. "Ecological Differences between Logging and Wildfire."**

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	"Fires do not leave a large road network in place (assuming the blaze was not suppressed otherwise there may be dozer lines, etc.). Logging creates roads that fragment habitat and generally increase human access, both of which affect the use of the land by wildlife. Moreover, roads and logging equipment can become vectors for the dispersal of weeds." http://wuerthner.blogspot.com/2008/12/ecological-differences-between-logging.html **Review: Not Relevant to the Project** *This is not a peer-reviewed article. The author states that wildfire is an important ecological process that is not emulated by logging practices, and distinguishes the effects from wildfire on the ecosystem vs. the effects from timber harvest. The effects he describes are generic in nature and not specific to the conditions in the Flint Foothills project area. The purpose and need for the project does not include mimicking effects from a large-scale fire, though the size and location of some proposed treatment units were designed to encompass stands created by past disturbance patterns and subsequent logging in the early 20th century.*
4	**Wuerthner, George. "Logging, thinning would not curtail wildfires"** ***The Eugene Register-Guard*****, December 26, 2008.** "Another surprising finding is that mechanical fuels treatment, commonly known as logging and thinning, typically has little effect on the spread of wildfires. In fact, in some cases, it can increase wildfires' spread and severity by increasing the fine fuels on the ground (slash) and by opening the forest to greater wind and solar penetration, drying fuels faster than in unlogged forests." http://wuerthner.blogspot.com/2008/12/logging-thinning-would-not-curtail.html **Review: Not Relevant to the Project** *This is an opinion piece, not a peer reviewed research paper.*
4	**Wuerthner, George. "Logging, thinning would not curtail wildfires"** ***The Register – Guard*** **(Eugene Ore.), December 26, 2008.** "Healthy ecosystems burn, and often burn by the tens of millions of acres. The spate of large wildfires we are experiencing now are not "abnormal" or an indication of "unhealthy" forest. Rather, we are seeing the natural response of a healthy forest ecosystem. Given that wildfire was so common for thousands of years, it is not surprising that recent research shows that wildfires, particularly severe wildfires, increase biodiversity. If anything, we probably need more wildfire, not less. With global warming we will probably get it, as vegetative communities adapt to new climatic realities." http://wuerthner.blogspot.com/2008/12/logging-thinning-would-not-curtail.html **Review: Not Relevant to the Project** *This is an opinion piece, not a peer reviewed research paper.*

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4	**Wuerthner, George. "Who Will Speak For the Forests?" *New West*, January 27, 2009.** "Logging equipment compacts soils. Logging removes biomass critical to future soil productivity of the forest. Logging disturbs sensitive wildlife. Logging typically requires roads and skid trails which create chronic sources of sedimentation that degrades water quality and aquatic organism habitat. Logging roads and skid trails are also a major vector for the spread of weeds. Logging disrupts nutrient cycling and flows. Logging can alter species composition and age structure (i.e. loss of old growth). Logging can alter fire regimes. Logging can change water cycling and water balance in a drainage. The litany of negative impacts is much longer, but suffice it to say that anyone who suggests that logging is a benefit or benign is not doing a full accounting of costs." Those who suggest that logging "benefits" the forest ecosystem are using very narrow definitions of "benefit." Much as some might claim that smoking helps people to lose weight and is a "benefit" of smoking." http://www.newwest.net/topic/article/who_will_speak_for_the_forests/C564/L564/ **Review: Relevant or Not Relevant to the Project** *This is an opinion paper, not peer-reviewed literature. The author believes that the only responsible uses of public lands are those that do not impair the lands and that the "real" ecological costs of logging need to be articulated to determine whether exploitation is justified. The role of environmental organizations is to continuously challenge the assumption that there is the "need" to log the forests, articulate the costs, and advocate responsible behavior that will reduce the demand for wood products. The Flint Foothills Vegetation Management Project implements direction in the Forest Plan. The environment effects of the alternatives are addressed by resource in the environmental consequences section of the DEIS. Project-specific design features are developed to reduce or eliminate adverse impacts from project activities, and are incorporated as an integrated part of the proposed action.*
4	**Wuerthner, George. "Temporary Roads are Like Low Fat Ice Cream." *New West.* March 17, 2009.** Please consider the following information: Sometimes temporary roads create more sediment per mile than system roads. This is because: 1) The earth must be handled twice … when constructing the road and when obliterating the road. 2) Temp roads are "designed" by a logger on a cat with no knowledge of hydrology and the logger is under pressure to work quickly. 3) Most temp roads are outsloped, thus, the water on the road drains off the road at random places. 4) Temp roads have no surfacing to slow the water velocity. High water velocity picks up more sediment particles. 5) Temp roads have no ditch. Ditches adjacent to system roads control the water until the road designer calls for an appropriate outlet culvert location. 6) Sediment-laden water leaves the temp road at random locations . . . often in the streams. Please read **"Temporary Roads are Like Low Fat Ice Cream"** by George Wuerthner, 3-17-09. The link to this article is at: http://www.newwest.net/topic/article/temporary_roads_are_like_low_fat_ice_cream/C564/L564/

Letter Number	Literature
	Review: Relevant to the Project *This non-peer-reviewed periodical article highlights some of the effects of temporary roads on turbidity and sedimentation. The article says temporary roads are like low fat ice cream, they seem to taste good, but as any nutritionist can tell you, you're are infinitely better off if you don't consume a lot of ice cream at all—low fat or otherwise. The same is true for roads. Temporary roads are only slightly better than a regular road, and no one should be fooled into thinking they somehow eliminate the negative impacts associated with roads just because they are "temporary".* *Because this project proposes to obliterate temporary roads after use, the effects of temporary roads will be reduced significantly. Most temporary roads are located away from stream channels and are not in RCAs. This will reduce the risk of sediment generated from temporary roads getting into stream channels. Further, BMPs such as water bars will be used to help disburse runoff and control sediment eroded from temporary roads.*
4	**Wuerthner, George. 'Pine Beetle Fears Misplaced' *Helena Independent Record,* March 25, 2010** "The current pine beetle "outbreak" that has led to tree mortality among Rocky Mountain forests has prompted some people to suggest that beetles are "destroying" our forests and that beetle-killed trees will invariably lead to larger wildfires. At the heart of this issue are flawed assumptions about wildfires, what constitutes a healthy forest and the options available to humans in face of natural processes that are inconvenient and get in the way of our designs. While it may seem intuitive that dead trees will lead to more fires, there is little scientific evidence to support the contention that beetle-killed trees substantially increase risk of large blazes. In fact, there is evidence to suggest otherwise." http://helenair.com/news/opinion/article_f3d671f0-37c9-11df-921d-001cc4c002e0.html **Review: Not Relevant to the Project** *This is an opinion piece in the Helena, MT newspaper. This is not a peer-reviewed scientifically-based article. Additionally, the proposed project does not assert that 'beetles are destroying' the project area, or that there is a 'substantially increase risk of large blazes'.*
1	**Yurkonis, Kathryn, Scott J, Meiners, and Brent E. Wachholder. 2005. Invasion impacts diversity through altered community dynamics. Journal of Ecology: 93, 1053–1061** **http://hmf.rutgers.edu/Pubs%20since%201982/Yurkonis%20Meiners%20and%20Wacholder%202005.pdf** As related to letter 1, comment 35; additional literature to address **Review: Not Relevant to the Project** *The article briefly discusses the various mechanisms of weed invasion impact to a community. Their study aimed to determine the mechanism for change within an invaded community. They looked at 4 exotic species invasions within abandoned agricultural fields in New Jersey, USA. In conclusion, they found species richness to decline with increased invasion intensity as a result of decreased colonization rates. Dissimilar to previous studies of invasion interactions, this study found no strong functional group interactions. This may be due to the highly disturbed successional study site where this study was conducted. The study clearly states that their "model system may not provide results applicable to*

Letter Number	Literature
	exotic invasions into previously undisturbed communities," as their model system utilized abandoned agricultural fields. In conclusion, the study proposes both neighborhood and population scales become standard scales for assessing invasion impacts. Though the study was interesting to read, the Forest Service will not be conducting similar studies and instead relies on the information provided through peer reviewed literature to analyze invader impacts on native communities.
4	**Ziemer, Robert R. Ph.D., "Effect of logging on subsurface pipeflow and erosion: coastal northern California, USA." Proceedings of the Chengdu Symposium, July 1992. IAHS Publication. No. 209, 1992.** "After logging, peak pipeflow was about 3.7 times greater than before logging." "The use of heavy logging equipment was expected to compact the soil, reduce infiltration rates, and increase surface runoff. In addition, heavy equipment might collapse some of the subsurface pipes, increasing local pore water pressure and the chance of landslides (Sidle, 1986)." http://www.fs.fed.us/psw/publications/ziemer/Ziemer92.PDF **Review: Relevant to the Project** *This peer-reviewed article looks at alterations in hillslope hydrology following logging. Significant alterations in hillslope hydrology are not expected as a result of this project. No potential flow increases are expected in project watersheds as a result of the project*
4	**Zimmerman, E.A. and P.F. Wilbur. "A Forest Divided" New Roxbury Land Trust newsletter, 2004.** "Forest fragmentation occurs when large, contiguous blocks of forest are broken up into isolated islands by development, roads, or clearing for agriculture. Just as inbreeding among the royal families of Europe spread hemophilia, forest fragmentation negatively impacts the long term sustainability of both plant and animal communities. Geographic isolation results in inbreeding and diminishes biodiversity." http://www.ourbetternature.org/forestfrag.htm **Review: Not Relevant to the Project** *This opinion piece discusses general impacts of forest fragmentation without reference to peer-reviewed literature citations. While the article contains several concepts related to fragmentation of habitats that would be considered for the analysis, it lacks the specificity necessary to address impacts to individual species.*
The Following 18 Statistically Significant Polls of Randomly Selected Americans Indicate that they do not Approve of Commercial Timber Sales in their National Forests	
4	Ignoring the clear message of the following 18 polls indicates that the Responsible Officials thinks the members of the public are pesky outsiders attempting to interfere in Forest Service business. **Poll #1** Who was Polled: New England residents

Letter Number	Literature
	Number of People Polled: 1,257 total Maine – 300, New Hampshire – 301, Vermont – 301 and Massachusetts, Connecticut, and Rhode Island – 355 Date(s) of Poll: July 2002 Question: How important to you personally is it to ensure that there are areas where people can go for recreation where there are no motorized vehicles or logging? Poll Findings: Southern NE / Northern NE Very Important 74% 69% Somewhat Important 20% 24% Link to Poll: http://www.brspoll.com/Reports/report-final.pdf **Review: Not relevant to the project** **Poll #2** Who was Polled: Residents of West Virginia Number of People Polled: 948 West Virginians at least 18 years of age living in households with telephones. Because the survey was designed to be a representative sample of all West Virginians, it was necessary to interview a specific person in the household. Therefore, interviewers asked to speak with the adult in the household with the most recent birthday. Date(s) of Poll: 1996 Question: Are West Virginia's current environmental laws for timber harvesting: 1) too restrictive, 2) fine as is, or 3) not restrictive enough? Poll Findings: 1) too restrictive: 3.6% 2) fine as is: 37.0% 3) not restrictive enough: 42.1% Link to Poll: http://www.polsci.wvu.edu/ipa/par/report_16_1.pdf **Review: Not relevant to the project** **Poll #3**

Letter Number	Literature
	Who was Polled: New England residents Number of People Polled: 1,500 Date(s) of Poll: summer of 1998 Question: Do you oppose or support protection of all remaining undisturbed forest? Poll Findings: 94% supported protection of all remaining undisturbed forest. Link to Poll: http://www.forestwatch.org/content.php?id=53 **Review: Not relevant to the project** **Poll #4** Who was Polled: Americans picked randomly nationwide from voter listings Number of People Polled: 800 registered voters Date(s) of Poll: June 22-25, 1998 Question: There has been a national debate about whether the U.S. Forest Service should continue to sell timber from our national forests. Do you favor or oppose continuing to allow timber companies to log in our national forests? Poll Findings: strongly favor logging in our national forests: 7% somewhat favor logging in our national forests: 17% neither: 2% somewhat oppose logging in our national forests: 19% strongly oppose logging in our national forests: 50% don't know 5% Link to Poll: http://www.sdearthtimes.com/et0998/et0998s6.html **Review: Relevant to the project** **Poll #5** Who was Polled: adult residents from across the province of Nova Scotia Number of People Polled: 400 Date(s) of Poll: 2003 Question: "Some people say that protecting more wilderness areas in Nova Scotia is necessary to conserve native plants and animals and for outdoor recreation. Others say there are already enough protected areas, and that to create more would be too costly, particularly for resource-

Letter Number	Literature
	based industries such as forestry and mining. All things considered, do you personally believe there should be more, the same amount, or fewer protected wilderness areas on publicly owned Crown land in Nova Scotia?" Poll Findings: More protected areas: 69% Same amount of protected areas: 28% Less protected areas: 3% Link to Poll: http://www.publicland.ca/news/040203.html **Review: Not relevant to the project** **Poll #6** Number of People Polled: 472 people living in Vermont Date(s) of Poll: February, 2002 Question: On a scale of 1 to 10, with 1 not being important and 10 being extremely important, how important is it for the Green Mountain National Forest to provide opportunities for logging, grazing, or mining? Poll Findings: 65% did not favor traditional development activities such as logging, grazing or mining. Link to Poll: http://crs.uvm.edu/wildpoll/exec_summ.pdf **Review: Not relevant to the project** **Poll #7** Who was Polled: North Carolina adults Number of People Polled: 584 Date(s) of Poll: Oct. 19-30, 1998 Question: In general, do you strongly support, somewhat support, somewhat oppose, or strongly oppose commercial logging in North Carolina's national forests? Poll Findings: 62% of adult residents opposed commercial logging in North Carolina's national forests Link to Poll: http://www.unc.edu/news/archives/feb99/carpoll3.htm **Review: Not relevant to the project** **Poll #8** Who was Polled: Alabama registered voters

<table>
<tr><th>Letter Number</th><th>Literature</th></tr>
<tr><td></td><td>Number of People Polled: 400
Date(s) of Poll: 2000
Question: Do you favor logging on national forests?
Poll Findings:
74% opposed logging
13% favored logging
13% were not sure.
Link to Poll: http://www.wildlaw.org/newsletters/July2000.htm
Review: Not relevant to the project

Poll #9
Who was Polled: Residents of Oregon and Washington
Number of People Polled: 600
Date(s) of Poll: May 2001
Question: Should old-growth forests on national forest lands be protected from logging?
Poll Findings: Yes – 75%
Link to Poll: http://www.conservationnw.org/library/newsletter/newsletter-pdfs/fall-ecosystemnews-2001.pdf
Review: Not relevant to the project

Poll #10
Who was Polled: Randomly selected Georgia residents
Number of People Polled: 792
Date(s) of Poll: January 21 – February 1, 1998
Question: Recently there has been a national debate about whether the United States Forest Service should be allowed to sell timber from Federal public lands, such as the Chattahoochee and Oconee National Forests. In general, do you support or oppose commercial logging in Georgia’s national forests?
Poll Findings:
Support Logging – 19.6%
Oppose Logging – 72.3%
Don’t Know / No Answer – 8.1%</td></tr>
</table>

Letter Number	Literature
	Link to Poll: http://www.johnmuirproject.org/resources-summary-of-polling-data-1998.html **Review: Not relevant to the project** **Poll #11** Who was Polled: Randomly selected Ohio residents Number of People Polled: 476 Date(s) of Poll: 1997 Question: Do you Support or Oppose Logging in Ohio's Wayne National Forest? Poll Findings: Support Logging – 26.5% Oppose Logging – 73.5% Link to Poll: http://www.johnmuirproject.org/resources-summary-of-polling-data-1998.html **Review: Not relevant to the project** **Poll #12** Who was Polled: Randomly selected registered voters in the United States Number of People Polled: 800 Date(s) of Poll: June 9-14, 1999 Question: Do you Support or Oppose Logging in Ohio's Wayne National Forest? Poll Findings: 63% felt too little of the national forests are protected from commercial development and would favor a proposal that protects all roadless areas of 1,000 acres and larger. Link to Poll: http://community.seattletimes.nwsource.com/archive/?date=19990806&slug=2975897 **Review: Not relevant to the project** **Poll #13** Who was Polled: Oregon and Washington residents Number of People Polled: 600 Date(s) of Poll: fall 2001

Letter Number	Literature
	Question: Do you support protecting public old-growth forests from logging? Poll Findings: 75% of Oregon and Washington residents support protecting public old-growth forests from logging (Pg. 9) Link to Poll: http://www.conservationnw.org/library/newsletter/newsletter-pdfs/fall-ecosystemnews-2001.pdf **Review: Not relevant to the project** **Poll #14** Who was Polled: Alabama registered voters Number of People Polled: 400 Date(s) of Poll: 2000 Question: Do you favor or oppose National Forest logging? Poll Findings: 74% opposed logging, 13% favored logging and 13% were not sure. Link to Poll: http://www.wildlaw.org/newsletters/July2000.htm **Review: Not relevant to the project** **Poll #15** Who was Polled: 344 district rangers and 124 forest supervisors randomly selected from a current organizational roster provided by the Washington Office of the Forest Service. Number of People Polled: 316 Of the 468 line officers selected, 246 (72 percent) of the district rangers and 70 (56 percent) of the forest supervisors returned usable questionnaires. Date(s) of Poll: 1990 Poll Findings and Questions: Table 1 (Pg 455) Mean scores on RPA questions for District Rangers and Forest Supervisors (Scale I to 5, I = Favorable, 5 = Unfavorable)

RPA Question	District Rangers N=246	Forest Supervisors N=70

Letter Number	Literature

Increased production of wood from National forest System lands	3.91	3.99
Use of herbicides on brush in National Forest management	3.02	3.40
Use of pesticide to control insect losses in National Forest management	2.85	2.71
User payment for non-market services from National Forest lands	2.36	2.26
Development of National Forest lands for recreation purposes	1.77	1.60
Livestock forage development on National Forest lands	3.06	3.01
Development of energy-related and other minerals on National Forest lands	2.84	2.74

Link to Poll: http://www.nationalaglawcenter.org/assets/bibarticles/brownharris_forest.pdf

Review: Relevant to the project.

Results of this study repeated twice in time are included in the economics specialist report.

Poll #16

Who was Polled: randomly selected voters in Washington state likely to vote in the November 2000 general election

Number of People Polled: 500

Date(s) of Poll: October 14-18, 1999

Poll Findings:

68% favor protecting existing natural areas for habitat and recreation by making them off limits to development and activities like logging and mining

Most (80%) likely voters say environmental issues are important to them when deciding how to vote, including a strong majority of Democrats (91%), Independents (80%), and Republicans (69%)

Link to Poll: http://www.lcvef.org/programs/polling-research/state-polling/LCVEF_Washington-Poll_Oct1999.pdf

Review: Not Relevant to the Project

Poll #17

Who was Polled: Americans randomly selected in the lower 48 states. A poll contracted by Chief Thomas.

Number of People Polled: 5,064

Date(s) of Poll: 2002

Questions and Poll Findings:

Public Beliefs about the roles of the Forest Service in their administration of the national forests.

<table>
<tr><th>Letter Number</th><th>Literature</th></tr>
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The Forest Service should	Average Public Response	Page
Conserve and protect watersheds	4.61	32
Preserve natural resources through policies such as no timber, no mining	4.21	37
Protecting ecosystems and wildlife habitat	4.53	55
Restrict timber harvest and grazing	3.94	56

1 = public feels that the action is not important for the Forest Service to undertake
5 = public feels that the action should be something emphasized by the Forest Service
Link to Poll: http://www.fs.fed.us/rm/pubs/rmrs_gtr095.pdf
USDA Forest Service RMRS GTR-95
Review: Relevant to the Project.
This study generally supports the purpose and need of the project.
Poll #18
Who was Polled: Registered voters in the Western United States
Number of People Polled: 1000
Date(s) of Poll: between Dec. 28, 1999 to Jan. 2, 2000
Question: Do you support or oppose allowing logging, mining and other industrial activities on national forest lands?
Poll Findings: Oppose-60% Support-31%
Link to Poll: http://www.gilawilderness.com/local/roadsurvy2.htm
Review: Relevant to the project
</td></tr>
</table>

Appendix C – Forest Plan Consistency

Table C- 1. Forest Plan standards and how they relate to the Flint Foothills Project

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
Air Quality			
1.	Meet Smoke management requirements according to the Idaho/Montana Airshed Group Operating Guide.	Yes; Air Quality section of DEIS, p.101.	
American Indian Rights and Interests			
1.	No impact to identified TCPs shall occur until Forest officials consult with the tribe or other cultural group who identified the property and their concerns have been considered. TCPs shall be identified through proactive consultation with affected tribes.	Yes; Heritage report, in the project file.	
Aquatic Resources			
1.	Riparian Conservation Area (RCA) -1 Any activity in RCAs shall be designed to enhance, restore, or maintain the physical and biological characteristics of the RCA by implementing the following requirements. Activities in RCAs, that meet or exceed RMOs, must be designed to maintain existing stream function. Activities in RCAs that are not meeting RMOs shall include a restoration component, commensurate with the scope of the activity affecting the fishery, which trends towards accomplishing desired stream function, as part of the project. Activities in RCAs shall not result in long-term degradation to aquatic conditions. Limited short-term effects from activities in the RCA may be acceptable when outweighed by the long-term benefits to the RCA and aquatic resources.	Yes; Hydrology section in the DEIS p.263.	
2.	Evaluate the risks of aquatic nuisance /exotic species introduction as part of project analysis (Scale – Project area).	Yes; Aquatics section in the DEIS p. 297.	

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
3.	Snow courses, snow pack telemetry sites, and precipitation gauges will be protected from project activity including maintenance of an adequate buffer to maintain reliability (scale – project area).	N/A	There are no snow courses, snow pack telemetry sites or precipitation gauges in the Flint Foothills Project area.
4.	Watersheds that provide water for public water supplies (i.e. where waters are classified by the State of Montana as A-Closed or A-1) shall be managed to meet State water quality standards established for protection of drinking water quality and be consistent with applicable source water protection plans.	N/A	There are no watersheds that provide water for public water supplies in the Flint Foothills Project area.
5.	New activities within known sensitive amphibian breeding sites and natal areas during breeding and juvenile rearing periods will not cause a threat to population viability or a trend toward federal listing (scale – breeding sites and natal areas identified at the project level).	N/A	There are no proposed activities near known amphibian breeding sites, and no harvest or road building is proposed in RCAs for the Flint Foothills Project.
6.	New management activities in restoration key watersheds will be consistent with recovery of desired aquatic systems.	N/A	There are no restoration key watersheds in the Flint Foothills Project area.

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
7.	Guidance defined in 16.2 – Section 1 (Permit Administration) of Beaverhead-Deerlodge Supplement No. 2209.13-98-1 to the Grazing Permit Administration Handbook Title 2209.13 will become mandatory rather than discretionary in Fish Key Watersheds when grazing contributes to degraded westslope cutthroat or bull trout stream conditions, and there is noncompliance with livestock grazing standards; or other aspects of livestock grazing permits terms and conditions.	N/A	The Flint Foothills DEIS is not a grazing document
8.	New projects will have a beneficial effect or no measurable negative effect on westslope cutthroat or bull trout in Fish Key Watersheds. Short-term negative effects are acceptable if outweighed by long-term benefits.	N/A	There are no fish key watersheds in the Flint Foothills Project area.
9.	Restoration projects should correct existing problems, not mitigate effects created by proposed activities (WR 3).	N/A	This is not a restoration project.
10.	If the only suitable location for incident bases, camps, helibases, staging areas, helispots and other centers for incident activities are within the RCA, an exemption may be granted following a review and recommendation by a resource advisor. The line officer will prescribe the location, use conditions, and rehabilitation requirements with avoidance of adverse effects to native fish and sensitive aquatic species as a primary goal.	N/A	There are no incident activities proposed as part of the Flint Foothills Pproject.
11.	Monitor water quality and aquatic resources in fish key watersheds where chemical retardant, foam, or additives are delivered to surface waters. Monitoring should take place as soon as conditions allow for safe access.	N/A	There are no fire suppression activities proposed as part of the Flint Foothills Project. There are no plans to add these substances to the surface waters.

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
12.	Require instream flows and habitat conditions for hydroelectric and other surface water development proposals to maintain or restore riparian resources, favorable channel conditions, fish passage, reproduction, and growth. Coordination will occur with the USFWS, other federal, state, and local agencies. (LH 1). During re-licensing of hydroelectric projects, provide written and timely license conditions to the Federal Energy Regulatory Commission (FERC) , that require fish passage and flows and habitat conditions that maintain/restore riparian resources and channel integrity. Coordinate re-licensing projects with the appropriate state agencies.	N/A	The Flint Foothills Project does not involve new or existing hydroelectric facilities.
13.	Locate new hydroelectric ancillary facilities for existing permits, outside RCAs. For existing ancillary facilities inside the RCA essential to proper management, provide recommendations to FERC to assure the facilities would not prevent attainment of the desired stream function and adverse effects on native fish and sensitive aquatic species are avoided. Where these objectives cannot be met, provide recommendations to FERC that such ancillary facilities should be relocated. Locate, operate, and maintain hydroelectric facilities that must be located in RCAs to avoid effects that would retard or prevent attainment of the desired stream function and avoid adverse effects on native fish and sensitive aquatic species (LH 2).	N/A	The Flint Foothills Project does not involve new or existing hydroelectric facilities.
14.	Grazing practices that prevent attainment of desired stream function, or are likely to adversely affect threatened or endangered species, or adversely impact sensitive species, are modified to attain desired stream function or population objectives (GM 1).	N/A	The Flint Foothills Project is not making decisions about grazing.
15.	Locate new livestock handling and/or management facilities outside of Riparian Conservation Areas. For existing livestock handling facilities inside Riparian Conservation Areas, assure facilities do not prevent attainment of desired stream function. Relocate or close facilities where these objectives cannot be met (GM 2).	N/A	The Flint Foothills Project is not making decisions about grazing.
16.	Limit livestock trailing, bedding, watering, salting, loading, and other handling efforts to those areas and times that would not retard or prevent attainment of desired stream function or adversely affect native fish and sensitive aquatic species (GM 3).	N/A	The Flint Foothills Project is not making decisions about grazing.

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
17.	If a notice of intent indicates a mineral operation would be located in an RCA, the effects of the activity on native fish and sensitive aquatic species is considered in the determination of significant surface disturbance pursuant to 36 CFR 228.4. For operations in an RCA, operators take all practicable measures to maintain, protect, and rehabilitate fish and wildlife habitat, which may be affected by the operations. Bonding requires the cost of stabilizing, rehabilitating, and reclaiming the area of operation will be covered (MM 1).	N/A	The Flint Foothills Project does not propose a mineral operation.
18.	Where no alternative to placing facilities in RCAs exists, facilities are located and constructed in ways that avoid impacts to RCAs and streams and adverse effects on native fish and sensitive aquatic species. Where no alternative to road construction exists, roads are kept to the minimum necessary for the approved mineral activity. Roads no longer required for mineral or land management activities are closed, revegetated, or obliterated (MM 2).	N/A	The Flint Foothills Project does not propose a mineral operation.
19.	Solid and sanitary waste facilities in RCAs are prohibited. If no alternative to locating mine waste (waste rock, spent ore, tailings) facilities in RCAs exists, releases can be prevented, and stability can be ensured, then (MM 3): Analyze the waste material using the best conventional sampling methods and analytic techniques to determine its chemical and physical stability characteristics. Locate and design the waste facilities using the best conventional techniques to ensure mass stability and prevent the release of acid or toxic materials. If the best conventional technology is not sufficient to prevent such releases and ensure stability over the long term, prohibit such facilities in Riparian Conservation Areas. Monitor waste and waste facilities to confirm predictions of chemical and physical stability, and make adjustments to operations as needed to avoid adverse effects to native fish and sensitive aquatic species and to attain desired stream function. Reclaim and monitor waste facilities to assure chemical and physical stability and re-vegetation to avoid adverse effects to native fish and sensitive aquatic species, and to attain the desired stream function. Reclamation bonds are adequate to ensure long-term chemical and physical stability and successful re-vegetation of disturbed areas and mine waste facilities.	N/A	The Flint Foothills Project does not involve solid or sanitary waste facilities.

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
20.	Sand and gravel mining and extraction within RCAs are prohibited (MM 5).	N/A	The Flint Foothills Project does not propose sand and gravel mining.
21.	Provide and maintain fish passage at new, replacement, and reconstructed road crossings of existing and potential fish-bearing streams, unless barriers are determined beneficial for native fish and/or sensitive aquatic species conservation (RF 5).	Yes; the aquatic section in the DEIS, p.297..	
22.	Complete watershed analysis prior to constructing roads or landings in RCAs within fish or restoration key watersheds (RF 2a).	N/A	No roads or landings are proposed in the fish key watersheds. There are no restoration watersheds in the Flint Foothills Project area.
23.	Where adjustments of recreation use impacts on desired stream function are not successful terminate activity or occupancy (RM 1).	N/A	The Flint Foothills Project is not making decisions on recreation use.

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
24.	Chemical pesticides and toxicants will be applied in a manner consistent with desired stream function and avoids adverse biological effects (RA 3).	Yes. A design feature in the proposed action provides that weeds would be treated following direction in the Noxious Weed Control Program Record of Decision (2002) for the Beaverhead-Deerlodge National Forest. Application would be consistent with this standard, DEIS, p.43.	
25.	Project-related storage of fuels and toxicants within riparian conservation areas is prohibited. Refueling within riparian conservation areas is prohibited except for emergency situations, in which case refueling sites must have an approved spill containment plan (RA 4).	Yes; project design features, DEIS, p. 43.	
26.	Fuelwood cutting and salvage in RCAs will not prevent or retard attainment of desired stream function (TM 1a).	N/A	The Flint Foothills Project does not propose fuelwood cutting; salvage would not occur within RCAs
27.	Vegetation and/or fuel management prescriptions in RCAs will be for the purpose of restoring, enhancing, or protecting the physical and biological characteristics of the RCA including Riparian Management Objectives. Vegetation and/or fuel treatments, for the purpose of protecting urban interface, private property and other investment, and public safety in RCAs shall be designed so as not to prevent the attainment of desired stream function (TM 1).	N/A	The Flint Foothills Project does not propose managing RCAs.

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
28.	Complete the evaluation of ongoing activities in fish key watersheds. Activities or conditions inconsistent with goals and objectives will be identified within 3 years and timeframes for implementation of mitigation will be identified.	N/A	The Flint Foothills Project is not evaluating ongoing activities in fish key watersheds.
Fire Management			
1	Wildland fire use plans shall be developed in coordination with the appropriate county, state, tribal, and other federal agencies.	N/A	The Flint Foothills Project does not include fire use planning.
2.	Wildland fire use is an available tool for all unplanned ignitions.	N/A	The Flint Foothills Project does not include fire use planning.
Heritage Resources			
1.	Heritage resources determined eligible for listing in the National Register of Historic Places will be preserved in place, or a consensus determination of "no adverse effect" will be reached with the Montana SHPO, the Advisory Council on Historic Preservation, and appropriate Indian tribes.	Yes; Heritage Report in the project file.	
2.	Unplanned discoveries of heritage resources during project implementation shall cause project operations in the area of the discovery to cease until analysis and evaluation of the heritage resources are completed, including consultation with the Montana SHPO and appropriate Indian tribes.	Yes; addressed in the project design features and mitigation measures section, DEIS, p.43.	
3.			
Infrastructure			

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
1.	Facility Design: Use the Rocky Mountain and Great Plains sections of the Built Environment Image Guide, (USDA FS-710, Dec. 2001), or equivalent for development of recreation sites, administrative sites, and approval of special use structures and facility design.	N/A	The Flint Foothills Project does not include facility development.
Lands			
1.	Energy transmission facilities shall be located only in designated utility corridors shown on the Utility Corridor and Communication Site map at the end of Chapter 3. Energy gathering or distribution facilities may be located outside of designated corridors.	N/A	The Flint Foothills Project does not include an energy transmission facility.
2.	Wireless telecommunication facilities shall be located in designated communication sites and utility corridors shown on the Utility Corridor and Communication Site map. Exceptions may be made for nonground-disturbing temporary facilities that are in place for less than one year.	N/A	The Flint Foothills Project does not include a wireless telecommunications facility.
3.	Comply with direction in USDA Forest Service Designation of Section 368 Energy Corridors on National Forest System Land in 10 Western States Decision by Secretary of Agriculture To Amend Land Management Plans Described as the Environmentally Preferred Alternative January 14, 2009.	N/A	The Flint Foothills Project does not involve an energy corridor.
Livestock Grazing			
1.	The interim standards in Table 6 apply to livestock grazing operations unless or until specific long-term objectives, prescriptions, or allowable use levels have been designed through individual resource management plans or site-specific NEPA decisions; for example, revised allotment management plans or Wilderness management plans. Interim standards apply to the following situations: Any allotment management plan lacking riparian management objectives and guides designed specifically for that allotment. Any riparian recreation site used primarily by recreation stock. Any outfitter operation where stock are grazed in a riparian area that lacks a specific riparian grazing strategy in the annual operating plan.	N/A	The Flint Foothills Project does not address compliance of livestock grazing operations with existing allotment management plans, including these interim standards.

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
2.	Domestic livestock grazing will not be allowed in developed recreation sites unless specifically permitted.	N/A	The Flint Foothills Project does not address compliance of livestock grazing operations with existing allotment management plans, including these interim standards.
3.	Allotment management plans will identify specific criteria for special areas, such as wet meadows, where limiting grazing at certain times of the years or under certain conditions is necessary to protect resources.	N/A	The Flint Foothills Project does not propose an allotment management plan.
4.	Base Property Requirement – ownership of facilities and land capable of producing feed for livestock 50% of the time permitted livestock are not grazing on National Forest, will be demonstrated before issuing grazing permits.	N/A	The Flint Foothills Project does not involve issuance of grazing permits.
Minerals, Oil, and Gas			
1.	Use the following table to describe the lease terms and prescribe stipulations for the Beaverhead Unit. Appendix B contains detailed language. (see Forest Plan Chapter 3, p. 27).	N/A	The Flint Foothills Project does not involve mineral, oil or gas leases.
2.	Any new road constructed for oil and gas activity will be obliterated unless the road is needed as part of the Forest Service permanent transportation system.	N/A	The Flint Foothills Project does not involve mineral, oil or gas leases.
3.	All drill pads will be obliterated.	N/A	The Flint Foothills Project does not involve a drill pad.

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
Recreation and Travel Management			
1.	Permanent road construction is not allowed in summer nonmotorized allocations or in areas evaluated for wilderness potential.	Yes; proposed permanent road construction is located in the road-based allocation within the Flint Foothills MA, DEIS, p. 349.	The Flint Foothills Project does not involve permanent road construction.
2.	Motorized vehicles are not allowed in summer or winter nonmotorized allocations except for permitted or administrative use.	Yes; a project design feature design feature applies travel restrictions DEIS, p. 43.	
3.	Restrict year-round, wheeled motorized travel to designated routes or areas. Where routes have not been designated through site-specific travel planning, restrict motorized vehicles to open motorized routes identified on the Forest Plan Interim Roads and Trails Inventory GIS Layer displayed on page 53. Motorized wheeled travel on routes leading to identified dispersed campsites is allowed. Exceptions may be authorized for: Motorized wheeled cross-country travel for any military, fire, search and rescue, or law enforcement vehicle used for emergency purposes. Authorized motorized wheeled cross-country travel is limited to official administrative duties or emergency services such as, fire suppression, prescribed fire, noxious weed control, vegetation restoration, surveying, and law enforcement. Motorized wheeled cross-country travel for other government entities on official administrative business as authorized through the normal permit processes or a memorandum of understanding. Motorized wheeled cross-country travel for lessees and permittees limited to terms described in the federal lease or permit.	Yes; closed unauthorized routes would be used as temporary roads, then decommissioned after authorized activities are complete, DEIS, table 6.	

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
4.	Extreme sport courses such as motocross trails, technical mountain bike courses, and motor vehicle challenge routes will not be constructed.	N/A	The Flint Foothills Project does not involve extreme sport courses.
5.	New outfitter and guide permits or increases in existing permits, will be only be made based on need, administrative capability, and a suitable mix of guided and nonguided public capacity determined by a forestwide capacity study. This mix may vary by type of activity and/or season of use. Capacity validation will be made on an area-specific basis when the general forestwide capacity determination does not adequately address the management situation. Heli-skiing operations will not be permitted.	N/A	The Flint Foothills Project does not involve outfitter and guide permits.
6.	New recreation resorts or residence tracts will not be permitted, nor will permits be issued for unoccupied tracts or lots.	N/A	The Flint Foothills Project does not involve recreation resorts or residence tracts.
7.	Manage summer nonmotorized allocations for either a primitive or semi-primitive nonmotorized setting from May 16 thru December 1, (p. 54).	N/A	The Flint Foothills Project would not change the management of summer nonmotorized areas.
8.	Manage winter nonmotorized allocations for a primitive or semi-primitive nonmotorized setting from December 2 thru May 15, (p. 55).	N/A	The Flint Foothills Project would not change the management of winter nonmotorized areas.

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
9.	Manage summer backcountry allocations for a semi-primitive motorized setting from May 16 thru December 1, (p. 54).	N/A	The Flint Foothills Project would not change the management of summer backcountry allocations.
10.	Manage recommended Wilderness for primitive or semi-primitive nonmotorized settings and protect Wilderness character.	N/A	There are no recommended Wilderness areas in the Flint Foothills Project area.
11.	Commercial timber harvest is prohibited in recommended Wilderness.	N/A	The Flint Foothills Project is not proposed in Wilderness.
12.	Road construction is not permitted in recommended Wilderness.	N/A	The Flint Foothills Project is not proposed in Wilderness.
13.	Wheeled or motorized vehicles designed for the primary purpose of transporting people, except for wheel chairs, are prohibited in recommended Wilderness except for permitted or administrative uses.	N/A	The Flint Foothills Project is not proposed in Wilderness.
Scenic Resources			
1.	Where no minimum SIOs are identified by landscape or management area – prior to the completion of a forestwide scenic integrity map – the objectives for scenery shall be determined by procedures outlined in the Landscape Aesthetics Handbook, Agricultural Handbook No. 701. The analysis shall use the Scenic Concern Level List in Appendix A, Scenic Attractiveness GIS layer, and the Scenery Integrity Level Matrix below. (See Forest Plan Chapter 3, p. 33).	Yes; see Scenic Resources section of DEIS, p.374.	

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
2.	Projects in nonmotorized and summer backcountry allocations will be designed to meet a minimum SIO of Moderate. Use the Scenic Concern Level List in Appendix A, Forestwide Scenic Attractiveness GIS layer, and Scenic Integrity Level Matrix above to determine a site-specific SIO. Project-level analysis may determine a higher SIO to be appropriate.	N/A	The Flint Foothills Project is not located in nonmotorized or summer backcountry allocations.
3.	Projects in foreground areas of scenic byways, national scenic trails or wild and scenic rivers will be designed to meet the SIO of at least High.	Yes; see Scenic Resources section of DEIS p. 374.	
Soils			
1.	The most current Northern Region Soil Quality Standards are adopted as Forest Plan soil standards.	Yes; see Soils section of the DEIS, p. 236.	
2.	Ground-based yarding shall not be allowed on slopes exceeding 35% without site-specific environmental analysis that shows damage is unlikely and soil goals and objectives can be met.	Yes; see Soils section of the DEIS, p. 236.	
Special Designations			
1.	Research Natural Areas or Special Interest Areas will be managed in accordance with their individual management plans in addition to the regulations (36 CFR 251.23), and the policy (FSM 4063 and 2370) pertaining to these areas.	N/A	The Flint Foothills Project is not associated with Research Natural Areas or Special Interest Areas.
2.	Streams determined to be Eligible for protection under the Wild and Scenic Rivers Act will be protected to maintain Outstandingly Remarkable Values. Standards for protection are provided in Forest Service Manual 1909.12.8.2.	N/A	There are no eligible streams within the project areas or otherwise associated with the Flint Foothills Project

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
Timber Management			
1.	On lands suitable for timber production, even aged harvest may occur only upon a finding that it is the appropriate and optimum method for the timber type and will contribute to meeting vegetative objectives for the site. Such harvest must be consistent with the protection of soil, watershed, fish, wildlife, recreation, and aesthetic resources. Harvest areas shall be blended to the extent practicable with the natural terrain.	Yes; Vegetation Report in the project file.	
2.	On lands suitable for timber production, the maximum size of openings created by one regeneration harvest operation shall not exceed 40 acres. Exceptions can be made where a natural event, such as fire, insect, disease, or windthrow created an undesirable opening. A regeneration harvest larger than 40 acres may be allowed after public notice, and review and approval by the officer one level above the responsible official. This only applies to harvest on suitable timber lands for timber production activities.	Yes; see Proposed Action section and the Vegetation section of the DEIS, pp. 5 and 64.	
3.	On lands suitable for timber production, even aged management regeneration harvest shall not occur unless the stand has reached the culmination of mean annual increment. An exception occurs where the primary purpose of treatment is for wildlife enhancement, visual enhancement, riparian area improvement or public safety or protection of property. The culmination of mean annual increment of growth requirement does not apply to cutting for experimental or research purposes; to nonregeneration harvests, such as thinning or other stand improvement measure; to management of uneven aged stands or to stands under uneven aged silvicultural system; and to salvage or sanitation harvesting of timber stands which are substantially damaged by events such as fire, insects, disease or windthrow. This only applies to harvest on suitable timber lands for timber production activities.	Yes; Vegetation Report in the project file.	
4.	Replace natural barriers to livestock movement removed by harvest activities with some other barrier.	Yes; project design features and mitigation measures, DEIS, p. x.	
5.	When trees are cut to achieve timber production objectives the cuttings shall be made in such a way as to assure that the technology and knowledge exists to adequately restock the lands.	Yes; Vegetation section of the DEIS, p. x.	

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
6.	The following Timber Harvest Classification Protocol establishes where timber harvest is not allowed and where timber harvest is permitted to meet other resource objectives. (See Forest Plan Chapter 3, pages 39-42.)	Yes; Vegetation section DEIS. p. 64.	
Vegetation			
1.	Mechanical vegetation treatments and prescribed fire in old growth stands (see Glossary) do not reduce the age and number of large trees and basal area below the 'minimum criteria' required for Eastern Montana old growth in Green et al, Table 3. Removing hazardous fuels within old growth stands is allowed if conducted in a manner that meets this requirement. This requirement does not apply to hazard tree removal and other public safety needs.	See; Vegetation section of the DEIS, p. 64.	
2.	Silvicultural examinations and prescriptions will be required prior to timber manipulation or silvicultural treatment. Exceptions are allowed for removal of trees that block vision along roads, removal of hazard trees, clearing of rights-of-way, clearing for mineral development, Christmas tree sales in encroachment areas, and removal of firewood.	Yes; Vegetation Report in the project file.	
Wildlife Habitat			
1.	From October 15 to December 1 Hunting Units that exceed the open motorized road and trail density objective will have no net increase in designated open motorized road and trail mileage (Scale – Hunting Units on National Forest lands).	N/A	The existing OMRTDs for Hunting Unit 212 meet Plan direction. Construction of temporary roads and use of existing closed roads would temporarily increase the OMRTD, but road densities in HU212 would remain below FP thresholds. These temporary roads would not be open to public use, roads in

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
			secure areas would not be used during the hunting season and would be obliterated or closed upon completion of harvest activities and there would be no net increase.
2.	Landscapes that exceed the open motorized road and trail objective will have no net increase in designated open motorized road and trail mileage (Scale – Landscapes on National Forest System Lands).	N/A	The existing OMRTDs for the Clark Fork-Flints landscape meet Forest Plan direction.
3.	Mechanical vegetation treatments will: Retain all snags greater than 20" d.b.h. (except for hazard trees). In addition, do not reduce the number of snags greater than 15.0" d.b.h. per acre in treatment units below the levels shown in the Table 12, calculated as an average for the total treatment unit acreage in a project area. This calculation allows variability among treatment units, which produces a more natural clumpy distribution. (See Forest Plan Chapter 3, p. 48). If there are insufficient snags in treatment units, live trees in the same size class must be retained and counted towards the snag requirement. These would be in addition to any requirements of Standard 4. These per acre requirements do not apply to the treatment units if analysis shows the levels of snags will be met for the project area as a whole. If, in the project area as a whole, there are insufficient live trees and/or snags greater than 15.0" d.b.h., the standard is deemed complied with by retention of the existing live trees and/or snags greater than 15.0" d.b.h. in the treatment units.	Yes; DEIS, pp. x and x.	

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
4.	Do not reduce the number of live trees greater than 10.0" d.b.h. per acre in regeneration harvest treatment units (to provide future snags) below the levels shown in Table 13 on the next page. (See Forest Plan Chapter 3, p. 49).	Yes; see Project Design Features And Mitigation Measures section, p. 43, and the Wildlife section of the DEIS, p. 143.	
5.	Sheep allotments in the Gravelly Landscape, which become vacant will be closed to sheep grazing or the vacant allotment may be used by an existing Gravelly Landscape sheep permittee, with no increase in permitted use (Scale – Gravelly Landscape).	N/A	The Flint Foothills Project is not addressing sheep allotments.
6.	The Grizzly Bear Amendment applies to only the Beaverhead-portion of the Forest and is incorporated as Appendix G (USDA Forest Service 2006b).	N/A	This only applies to the Beaverhead portion of the Forest
7.	The Northern Rockies Lynx Management Direction (2007) is included in Appendix G, and will apply to the Beaverhead- Deerlodge National Forest as described in the Northern Rockies Lynx Management Record of Decision.	Potentially No	Preliminary information suggests that treatment within four units under alternatives 2 and 3 may be inconsistent with Standard Veg S6. Further field review is needed to verify habitat conditions.

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
8.	Within 18 kilometers of documented active or inactive sage grouse leks, do not remove sagebrush within 300 meters of riparian zones, meadows, lakebeds or farmland, unless site-specific analysis indicates such removal promotes achievement of the sagebrush habitat goal. Springs developed for livestock water in these areas must be designed to maintain free water and wet meadows.	N/A	The Flint Foothills Project area is located more than 18 miles north of the nearest known sage grouse lek site and contains little or no suitable sage grouse habitat. This project would not remove sagebrush
9.	Mitigate, through avoidance or minimization, management actions around known active nest sites of threatened, endangered, proposed candidate, and sensitive bird species, if those actions would disrupt reproductive success during the nesting period. During project planning consider applicable science regarding species needs (such as nesting periods and buffers) and site-specific considerations. This standard also applies to Great Gray Owl and Northern Goshawk.	Yes; see Project Design Features and Mitigation Measures, chapter 2; the Wildlife section, and appendix x.	
10.	When closing entrances to abandoned mines, determine whether suitable habitat for bats exists, and where it does, provide access for bats.	N/A.	The Flint Foothills Project does not close abandoned mines.
11.	Implement the most current National Fish and Wildlife Service Terms and Conditions for wolves in the northwest Montana recovery area (west of I-15 and north of I-90) until such time as the gray wolf is delisted. (See Appendix I)	N/A.	Wildlife section of the DEIS. p. 190. Wolves in the Flint Foothills Project area were delisted on May 5, 2011. Terms and conditions do not apply.

Standard	Standard Description	Does the Proposed Action Meet the Standard? (Yes, No, N/A). If "Yes" include where supporting documentation is addressed.	If "No" or 'N/A" provide an explanation.
12.	Provide habitat for species requiring large woody debris in forested habitat types by retaining post project outcomes for regeneration harvest of the following: (Scale project) Lodgepole cover type-6 pieces/ac with small end diameter equal to or greater than 8 inches and 10-ft long. Douglas-fir cover type-6 pieces/ac with small end diameter equal to or greater than 12 inches and 10-ft long.	Yes; see project design features, and Wildlife section; DEIS, pp. 43. And 143.	

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Appendix D – Cumulative Effects Analysis

Cumulative Effects

Past Vegetation and Prescribed Fire Activities

The following discussion focuses on the past vegetation and prescribed fire activities in the Flint Foothills project area that contribute to the current condition. Figure D-1displays the past vegetation and prescribed fire activities that tie to the activities shown in table D-1.The Flint Foothills Project proposed action is also displayed to show the spatial relationship. Both the table and map reflect data at the 6th field HUC watershed level, which extends beyond the project area boundary. The past activities outside of the project boundary are not included in the cumulative effects analyses, unless indicated specifically in a resource section.

Timber Harvest

Timber harvest likely began in the project area in the 1870s, and increased primarily in support of mining activities in local areas such as the Rose Mine in the Dunkleberg drainage, with extensive logging occurring on National Forest lands from 1906 through 1917; this pattern was likely common on all lands within 50 miles of Butte and Anaconda (Losensky 1997). No data is available for the logging done during this time period.

The data record for timber harvest begins in the 1950s. There is no known record prior to that date. Where possible, the year of the timber sale termination date was used for the date of the activities in the tables below. However, timber sale activities for a given timber sale can span several years and may overlap into different decades. As with any record, there may be errors in recording; however, the data displayed below represents the current data record. A summary of harvest by decade is contained in the Vegetation section of the analysis.

The catalog of past projects in table D-1 is comprehensive based on information available to the Forest Service. However there may be some unintended omissions due to lack of current records or knowledge. Information on past activities was gathered from the Forest Service Activity Tracking System (FACTS), which is an activity tracking system for all levels of the Forest Service, District files, and collective knowledge of local Forest Service employees.

Precommercial Thinning

Precommercial thinning of past harvest units began in the 1960s with the objective to reduce stand densities and improve growing conditions for the retained trees. As with any record, there may be errors in recording; however, the data displayed below represents the current data record. A summary of prescribed fire by decade is contained in the Vegetation section of the analysis.

Prescribed Fire

The data record for prescribed fire begins in the 1950s. There is no known record prior to that date. Most of the early records of prescribed fire are associated with timber sale activities—the disposal of activity fuels left behind after logging. Some prescribed fire use has occurred to improve stand conditions for certain vegetation species, such as removing conifer succession in grassland areas. As with any record, there may be errors in recording; however, the data displayed below represents the current data record. A summary of prescribed fire by decade is contained in the beginning of chapter 3.

Table D- 1. Past Vegetation and prescribed fire activities within the 6th Code HUCs associated with the Flint Foothills project.

6th Code HUC, Decade, and Activity	Acres
Boulder Creek	**13879**
1950-1959	**1352**
Burning of Piled Material	137
Group Selection Cut (UA/RH/FH)	120
Overstory Removal Cut (from advanced regeneration) (EA/RH/FH)	15
Piling of Fuels, Hand or Machine	555
Single-tree Selection Cut (UA/RH/FH)	526
1960-1969	**1478**
Burning of Piled Material	671
Jackpot Burning - Scattered concentrations	65
Piling of Fuels, Hand or Machine	315
Precommercial Thin	28
Seed-tree Seed Cut (with and without leave trees) (EA/RH/NFH)	15
Single-tree Selection Cut (UA/RH/FH)	316
Stand Clearcut (EA/RH/FH)	68
1970-1979	**1607**
Burning of Piled Material	419
Commercial Thin	314
Piling of Fuels, Hand or Machine	419
Seed-tree Seed Cut (with and without leave trees) (EA/RH/NFH)	8
Single-tree Selection Cut (UA/RH/FH)	99
Stand Clearcut (EA/RH/FH)	350
1980-1989	**633**
Burning of Piled Material	170
Commercial Thin	112
Liberation Cut	12
Piling of Fuels, Hand or Machine	102
Precommercial Thin	86
Sanitation (salvage)	19
Seed-tree Seed Cut (with and without leave trees) (EA/RH/NFH)	28
Shelterwood Establishment Cut (with or without leave trees) (EA/RH/NFH)	75
Single-tree Selection Cut (UA/RH/FH)	29
1990-1999	**3924**
Burning of Piled Material	864
Commercial Thin	634
Improvement Cut	172
Jackpot Burning - Scattered concentrations	113
Patch Clearcut (EA/RH/FH)	29
Piling of Fuels, Hand or Machine	1529

6th Code HUC, Decade, and Activity	Acres
Sanitation (salvage)	215
Seed-tree cut (w/res) (EA/RN/NFH)	187
Special Cut	44
Stand Clearcut (EA/RH/FH)	0
Stand Clearcut (w/ leave trees) (EA/RH/FH)	136
2000-2009	**4847**
Broadcast Burning - Covers a majority of the unit	1012
Burning of Piled Material	1433
Commercial Thin	383
Improvement Cut	475
Jackpot Burning - Scattered concentrations	68
Piling of Fuels, Hand or Machine	1104
Seed-tree Seed Cut (with and without leave trees) (EA/RH/NFH)	3
Shelterwood cut (w/res) (EA/RN/NFH)	38
Special Cut	87
Stand Clearcut (w/ leave trees) (EA/RH/FH)	244
2010-pres*	**39**
Burning of Piled Material	39
Clark Fork River-Gold Creek	**27556**
1960-1969	**2694**
Broadcast Burning - Covers a majority of the unit	515
Burning of Piled Material	178
Piling of Fuels, Hand or Machine	178
Stand Clearcut (EA/RH/FH)	1797
Stand Clearcut (w/ leave trees) (EA/RH/FH)	26
1970-1979	**9331**
Burning of Piled Material	2659
Commercial Thin	70
Patch Clearcut (EA/RH/FH)	33
Piling of Fuels, Hand or Machine	3359
Seed-tree Seed Cut (with and without leave trees) (EA/RH/NFH)	181
Shelterwood Establishment Cut (with or without leave trees) (EA/RH/NFH)	654
Single-tree Selection Cut (UA/RH/FH)	4
Special Cut	4
Stand Clearcut (EA/RH/FH)	2340
Stand Clearcut (w/ leave trees) (EA/RH/FH)	26
1980-1989	**7261**
Burning of Piled Material	2111
Commercial Thin	1428
Liberation Cut	6

6th Code HUC, Decade, and Activity	Acres
Piling of Fuels, Hand or Machine	1876
Precommercial Thin	299
Sanitation (salvage)	365
Seed-tree Seed Cut (with and without leave trees) (EA/RH/NFH)	89
Shelterwood Establishment Cut (with or without leave trees) (EA/RH/NFH)	68
Shelterwood Preparatory Cut (EA/NRH/NFH)	6
Shelterwood Removal Cut (EA/NRH/FH)	140
Single-tree Selection Cut (UA/RH/FH)	642
Special Cut	41
Stand Clearcut (EA/RH/FH)	167
Stand Clearcut (w/ leave trees) (EA/RH/FH)	23
1990-1999	**5224**
Broadcast Burning - Covers a majority of the unit	152
Burning of Piled Material	1685
Commercial Thin	820
Improvement Cut	41
Liberation Cut	56
Piling of Fuels, Hand or Machine	1395
Precommercial Thin	410
Sanitation (salvage)	120
Seed-tree Seed Cut (with and without leave trees) (EA/RH/NFH)	130
Shelterwood Establishment Cut (with or without leave trees) (EA/RH/NFH)	144
Special Cut	27
Stand Clearcut (EA/RH/FH)	123
Stand Clearcut (w/ leave trees) (EA/RH/FH)	111
Wildlife Habitat Prescribed fire	12
2000-2009	**3037**
Broadcast Burning - Covers a majority of the unit	86
Burning of Piled Material	937
Commercial Thin	239
Improvement Cut	295
Piling of Fuels, Hand or Machine	692
Precommercial Thin	546
Seed-tree cut (w/res) (EA/RN/NFH)	31
Shelterwood Establishment Cut (with or without leave trees) (EA/RH/NFH)	139
Shelterwood Preparatory Cut (EA/NRH/NFH)	33
Stand Clearcut (w/ leave trees) (EA/RH/FH)	39
2010-present	**9**
Commercial Thin	7
Piling of Fuels, Hand or Machine	2

6th Code HUC, Decade, and Activity	Acres
Lower Flint Creek	**17379**
1950-1959	**192**
Piling of Fuels, Hand or Machine	96
Single-tree Selection Cut (UA/RH/FH)	96
1960-1969	**4658**
Broadcast Burning - Covers a majority of the unit	105
Burning of Piled Material	1063
Group Selection Cut (UA/RH/FH)	31
Jackpot Burning - Scattered concentrations	16
Piling of Fuels, Hand or Machine	1203
Seed-tree Preparatory Cut (EA/NRH/NFH)	21
Seed-tree Seed Cut (with and without leave trees) (EA/RH/NFH)	91
Shelterwood Establishment Cut (with or without leave trees) (EA/RH/NFH)	250
Single-tree Selection Cut (UA/RH/FH)	297
Stand Clearcut (EA/RH/FH)	1580
Stand Clearcut (w/ leave trees) (EA/RH/FH)	1
1970-1979	**6132**
Broadcast Burning - Covers a majority of the unit	132
Burning of Piled Material	1762
Commercial Thin	227
Group Selection Cut (UA/RH/FH)	126
Overstory Removal Cut (from advanced regeneration) (EA/RH/FH)	70
Piling of Fuels, Hand or Machine	1828
Precommercial Thin	271
Sanitation (salvage)	73
Shelterwood Establishment Cut (with or without leave trees) (EA/RH/NFH)	229
Single-tree Selection Cut (UA/RH/FH)	414
Stand Clearcut (EA/RH/FH)	906
Stand Clearcut (w/ leave trees) (EA/RH/FH)	94
1980-1989	**2798**
Broadcast Burning - Covers a majority of the unit	13
Burning of Piled Material	372
Commercial Thin	452
Liberation Cut	85
Piling of Fuels, Hand or Machine	587
Precommercial Thin	56
Sanitation (salvage)	19
Seed-tree Final Cut (EA/NRH/FH)	60
Seed-tree Seed Cut (with and without leave trees) (EA/RH/NFH)	250
Shelterwood Establishment Cut (with or without leave trees) (EA/RH/NFH)	49

6th Code HUC, Decade, and Activity	Acres
Shelterwood Removal Cut (EA/NRH/FH)	61
Special Cut	27
Stand Clearcut (EA/RH/FH)	754
Tree Release and Weed	13
1990-1999	**2381**
Burning of Piled Material	1395
Commercial Thin	9
Piling of Fuels, Hand or Machine	441
Precommercial Thin	65
Seed-tree Seed Cut (with and without leave trees) (EA/RH/NFH)	258
Shelterwood Removal Cut (EA/NRH/FH)	27
Special Cut	25
Stand Clearcut (EA/RH/FH)	69
Stand Clearcut (w/ leave trees) (EA/RH/FH)	92
2000-2009	**1163**
Broadcast Burning - Covers a majority of the unit	263
Burning of Piled Material	270
Commercial Thin	186
Improvement Cut	32
Piling of Fuels, Hand or Machine	253
Precommercial Thin	84
Shelterwood cut (w/res) (EA/RN/NFH)	75
2010-present	**55**
Piling of Fuels, Hand or Machine	55
Grand Total	**58814**

Present and Reasonably Foreseeable Actions

A discussion on cumulative effects and identification of the present and reasonably foreseeable actions relevant to the Flint Foothills analysis (table 23 in Volume 1) are provided in the introduction to chapter 3. The activities in table D- 1 are displayed at the project scale in figure D- 1. Figure D- 2 displays the information at a broader, landscape view and includes the proposed action. Figure D- 3 presents present and reasonably foreseeable activities at the landscape scale.

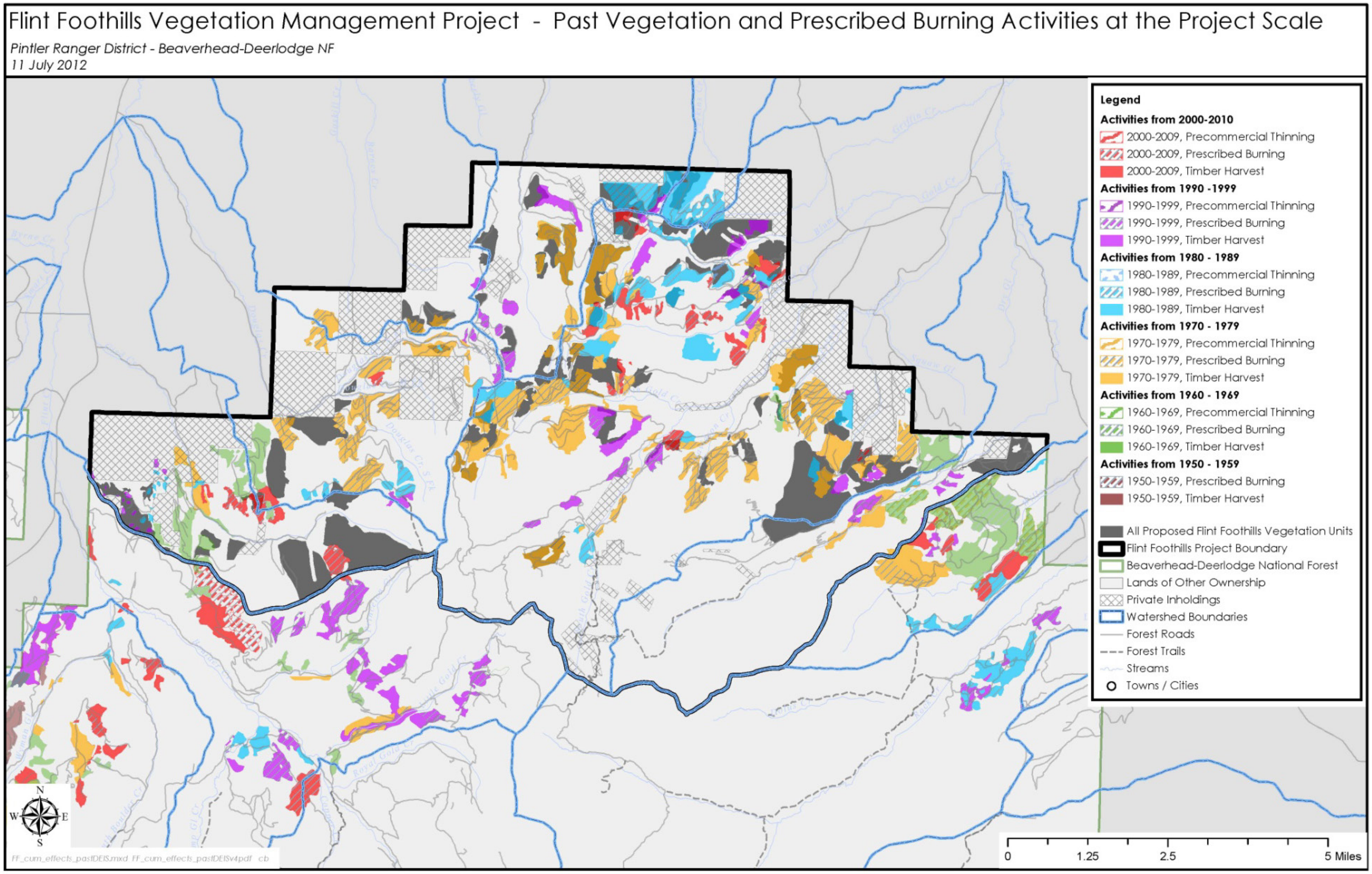

Figure D- 1. Past vegetation and prescribed burning activities at the project scale

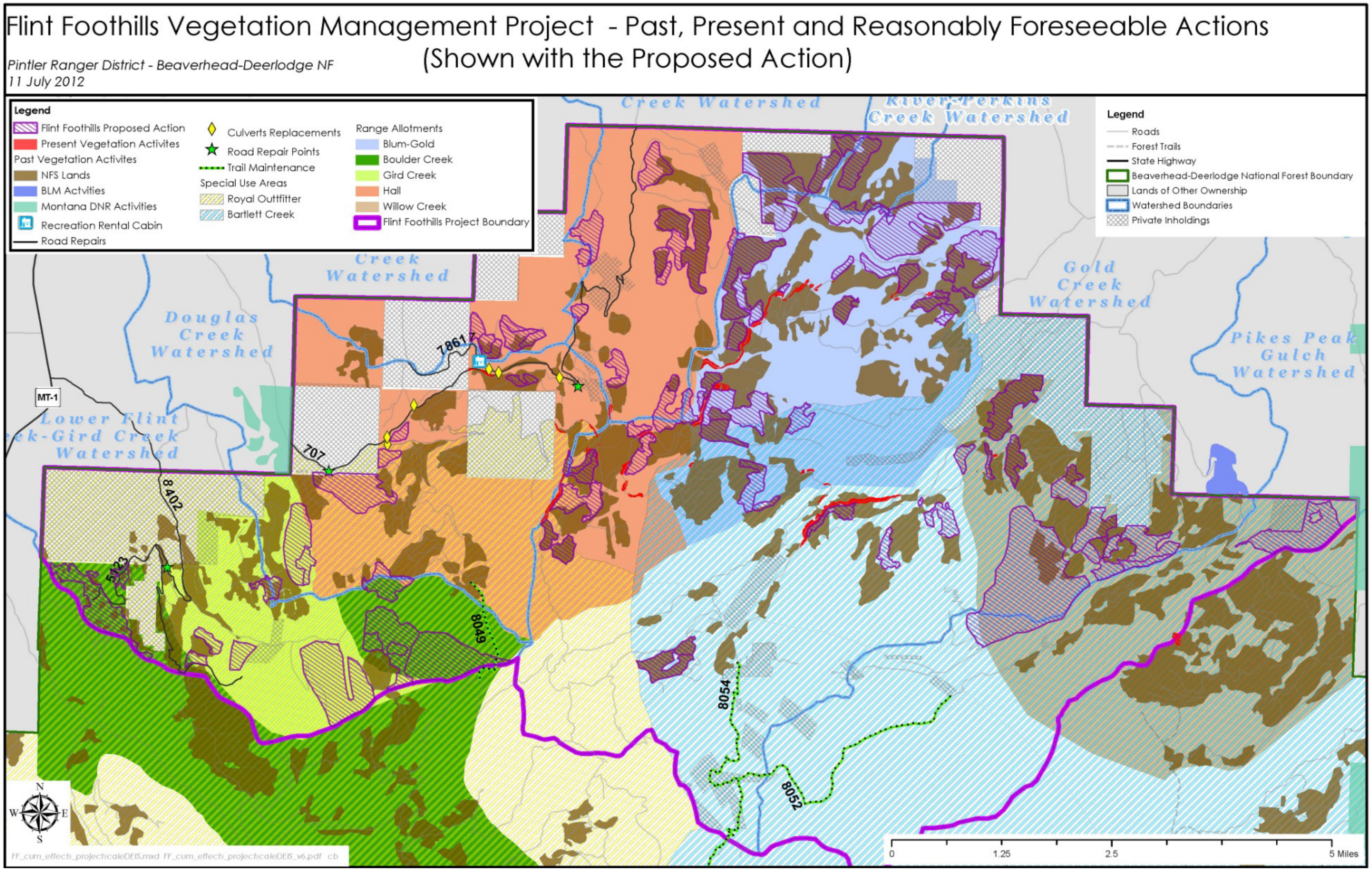

Figure D- 2. Past, present and reasonably foreseeable actions shown with the proposed action

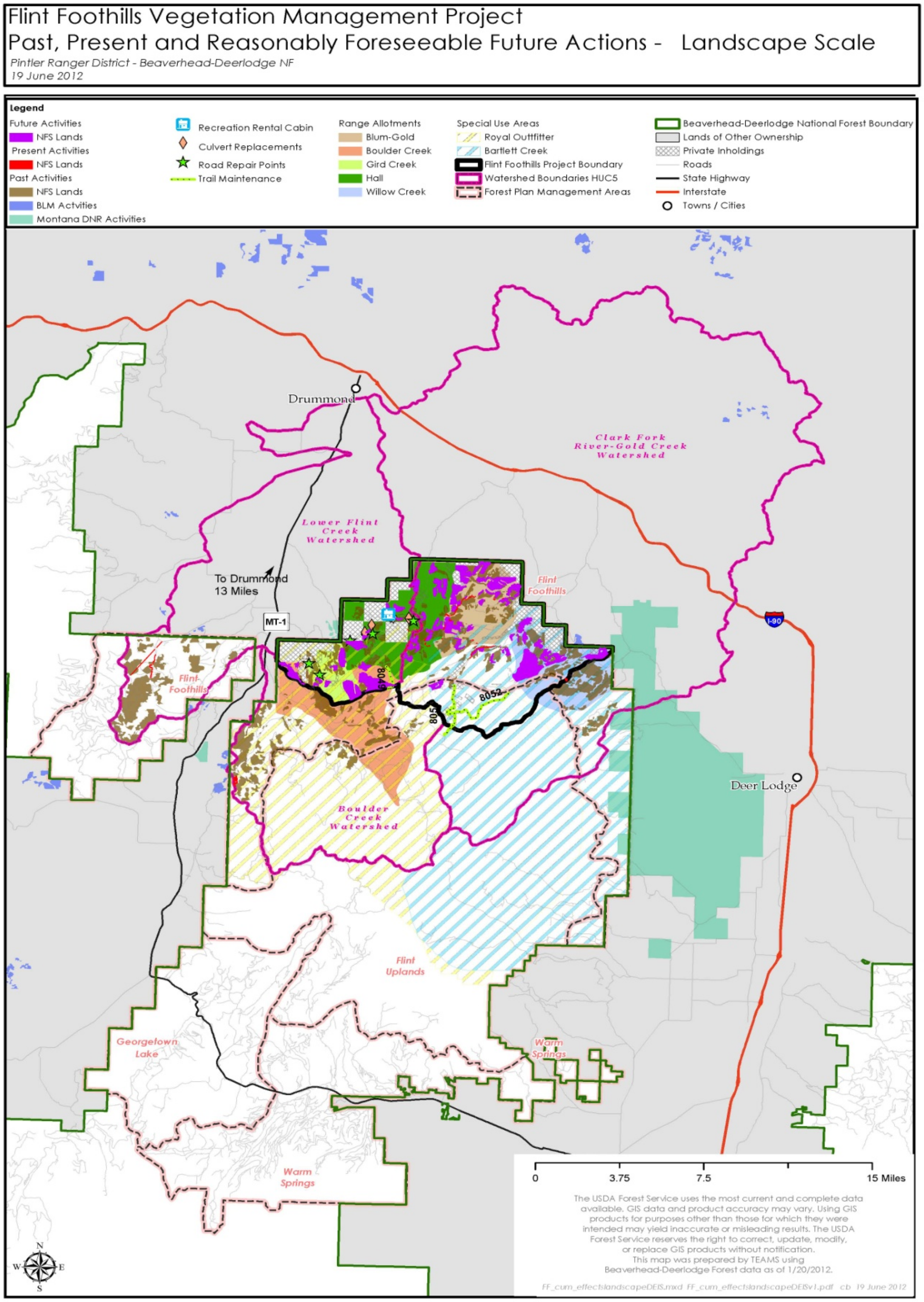

Figure D- 3. Past, present and reasonably foreseeable actions at the landscape scale

Appendix E – Vegetation Attributes

Attribute Tables in Order

Commercial Thinning – Douglas-fir and Ponderosa Pine

Seed Tree Harvest – Douglas-fir and Ponderosa Pine

Salvage by Clearcut – Dead and Dying Lodgepole Pine

Prescribed Burning

Table E- 1. Attribute summary of commercial thinning Douglas-fir and ponderosa pine stands

Unit #	Stand description	Acres
6C	Variable density DF stand; 120-180 BA. Some dead LP and minor component of aspen. Average age of stand 130 years old. Average age and diameter of trees to be left: ave age 170 yrs and 22 inches DBH. Stand contains old growth.	14
8C	Variable density DF stands; 160-240 BA; 20-40% LP; ave age: 120 years.	13
10C	Density varies from 140 to 180 BA. Scattered old trees; ave stand age 120 years.	31
11C	Ave age: 120 years; ave density 120 BA. 20-40% LP and 40-60% DF. >60% LP dead	17
12C	Ave age: 110 years; density from 160-210 BA. 60% LP 40% DF >60% LP dead	33
20C	Variable densities DF stand with some LP. Ave age: 125, with few scattered old trees (about 1 every 2 acres). Ave density is 120-180 BA. Some aspen.	64
22C	Ave age 125 years, with variable BA from 120 to 160. Some aspen.	16
23C	Density varies from 80 to 180 BA. Numerous aspen clones, some LP. Scattered old trees; ave stand age 120 years. Old growth component 180+ yrs. 60-80% DF 20-40% PP mixed.	69
24C	Variable density DF stand with some LP. Ave age: 125, with few scattered old trees (about 1 every 2 acres). Ave density is 120-180 BA. Some aspen.	14
25C	Ave age: 120 years, with ave density 80-140 BA. Contains old growth DF/PP 200+ yrs. in pockets on NE end of proposed unit.	5
28C	Ave age: 120 years, with ave density 60-160 BA. Mainly DF 60-90% variable with LP and a small component of ES.	6
29C	Ave age: 120 years, with ave density 60-180 BA. Mainly DF 60-80% variable with LP.	6
31C	Density from 80-180 BA, with ave age ranging between 80-120 years old. Small component of LP and ES. Majority over 80% being DF.	24
33C	Density from 80-180 BA, with ave age ranging between 80-120 years old. Small component of LP and ES. Majority over 80% being DF.	26
42C	Density from 80-120 BA, with ave age ranging between 80-120 years old. DF averaging 30-60% and LP 40-60% being variable across the harvest unit.	31
48C	Density from 120-210 BA, with ave age ranging between 80-120 years old. DF is 30-40% with LP 40-60% with some ES and aspen.	157
55C	Density from 80-180 BA, with ave age ranging between 80-120 years old. Small component of LP and ES. Majority over 80% being DF. Northeast ½ of harvest unit contains old growth as displayed on map. Old growth ave DBH is 18 inches with largest tree 31 inches; age ranges between 180-300 yrs old.	175
56C	Density from 80-140 BA, with ave age ranging between 80-120 years old. Small component of LP and ES. Majority over 80+% being DF.	18
57C	Density from 80-140 BA, with ave age ranging between 80-120 years old. Small component of PP. Majority mixed with 30-40% LP and 40-60% being DF.	27
59C	Density from 80-140 BA, with ave age ranging between 80-120 years old. Small	20

Unit #	Stand description	Acres
	component of LP and ES. Majority over 90+% being DF. Ave DBH is roughly 9 inches.	
60C	Density from 80-140 BA, with ave age ranging between 80-120 years old. Small component of LP and ES. Majority over 90+% being DF. Ave DBH is about 9 inches. Retention trees are 15+ inch DBH DF at about a BA of 40-50.	14
64C	Density from 80-140 BA, with ave age ranging between 80-140 years old. Small component of LP and ES. Majority over 90% being DF. PP makes up less than 10%.	25
65C	Density from 80-140 BA, with ave age ranging between 80-120 years old. Small component of LP and ES. Majority over 90+% being DF.	18
66C	Density from 80-140 BA, with ave age ranging between 80-120 years old. Component 30-40% of LP. 60 +% being DF.	24
67C	Density from 80-180 BA, with ave age ranging between 80-120 years old. Component of LP 40-70% and 30-50% being DF. Ave DBH is roughly 9 inches.	33
68C	Density from 80-140 BA, with ave age ranging between 80-120 years old. Small component of LP and ES. Majority over 90+% being DF.	38
71C	Density from 80-120 BA, with ave age ranging between 80-120 years old. Small component of LP and ES. Majority over 90+% being DF. Ave DBH is roughly 9 inches.	122
80C	Density from 180-220 BA, with ave age ranging between 80-120 years old. Small component of LP and ES. Majority over 90+% being DF. Ave DBH is roughly 9 inches.	31
81C	Density from 80-180 BA, with ave age ranging between 80-120 years old. Small component of LP and ES. Majority over 90+% being DF. 1-2 tpa of remnant DF.	9
	Total acres of commercial DF thin	**1,149**

DF: Douglas-fir
PP: ponderosa pine
LP: lodgepole pine
ES: Engelmann spruce
TPA: trees per acre
BA: basal area

Table E- 2. Attribute summary of seed tree harvest in Douglas-fir and ponderosa pine stands

Unit #	Stand description	Acres
1ST	Density from 40-120 BA, with ave age ranging between 80-120 years old. Small component of PP 10% and LP 1%. Majority over 90+% being DF.	102
5ST	Density from 80-120 BA, with ave age ranging between 80-120 years old. Majority over 90+% being DF.	47
27ST	Density from 40-140 BA, with ave age ranging between 80-120 years old. Small component of PP. Majority over 90+% being DF. Aspen clones exist and are vigorous. Minor component of remnant DF and PP exist.	139
30ST	Density from 80-140 BA, with ave age ranging between 80-120 years old. Small component of LP and ES. Majority over 90+% being DF.	39
32ST	Density from 80-220 BA, with ave age ranging between 80-120 years old. Small component of LP. Majority over 90+% being DF.	18
65ST	Density from 60-120 BA, with ave age ranging between 80-160 years old. Small component of PP 20%. Majority over 70+% being DF.	8
	Total acres of seed tree harvest with reserve trees	**353**

DF: Douglas-fir
PP: ponderosa pine
LP: lodgepole pine
ES: Engelmann spruce
TPA: trees per acre
BA: basal area

Table E- 3. Salvage by clearcut lodgepole pine stands (all lodgepole over 5 inches diameter removed)

Unit #	Stand description	Vegetation Category/Snags	Acres
16S	Retain DF and aspen. No exam data available for this unit. Informal walk through exams show small amount of DF.	Warm vegetation type: Trees >15" diameter unknown	7
19S	Retain DF and aspen. No exam data available for this unit. Informal walk through exams show small amount of DF 10-20 BA 15+ inches.	Warm vegetation type: Trees >15" diameter unknown	41
26S	Retain DF and aspen. No exam data available for this unit. Informal walk through exams show small amount of DF.	Warm vegetation type: Trees >15" diameter unknown	25
34S	Retain DF and aspen. No exam data available for this unit. Informal walk through exams show 15-25% DF in overstory.	Warm vegetation type: Trees >15" diameter unknown	78
35S	Retain DF/AF and aspen. There are 23 live DF/ES leave trees per acre that are 10+ inches in diameter.	Warm vegetation type: 23 live trees 10"+, No trees >15"	50
36S	Retain DF/AF and aspen. There are 112 live AF/ES leave trees per acre that average 8.7 inches in diameter.	Cool vegetation type: 28 live trees 10"+ 24 dead trees 15"+	61
37S	Retain DF and aspen. No exam data available for this unit. Informal walk through exams show small amount of DF.	Warm vegetation type: Trees >15" diameter unknown	8
39S	Retain DF and aspen. No exam data available for this unit.	Warm vegetation type: Trees >15" diameter unknown	79
40S	Retain DF/AF and aspen. There are 160 live AF leave trees per acre that average 7.3 inches in diameter.	Cool vegetation type: 6 live trees 10"+ 11 live or dead trees 15"+	29
41S	Retain DF and aspen. No exam data available for this unit. Informal walk through exams show small amount of DF.	Warm vegetation type: Trees >15" diameter unknown	4
43S	Retain DF and aspen. No exam data available for this unit. Informal walk through exams show small amount of DF.	Warm vegetation type: Trees >15" diameter unknown	11
44S	Retain AF/ES and aspen. There are 92 live AF/ES leave trees per acre that average 5.8 inches in diameter. Small diameter stand.	Cool vegetation type: No live trees >10"; No >15" trees	31
45S	Retain DF/AF and aspen. There are 20 live AF leave trees per acre that average 4 inches in diameter.	Cool vegetation type: 6 live trees 10"+ 3 dead trees 15"+	31
46S	Retain DF and aspen. There are 128 live DF leave trees per acre that average 10.2 inches in diameter.	Warm vegetation type: 128 live trees 10"+ 2 dead trees 15"+	79
47S	Retain AF/WBP and aspen. No exam data available for this unit. Informal walk through exams show small amount of AF/WBP.	Warm vegetation type: Trees >15" diameter unknown	13
49S	Retain AF/ES and aspen. There are 91 live AF/ES leave trees per acre that average 7.8 inches in diameter.	Cool vegetation type: 54 live trees 10"+ 4 live and dead trees 15"+	43

Unit #	Stand description	Vegetation Category/Snags	Acres
50S	Retain DF and aspen. There are 4 live DF leave trees per acre that average 14.0 inches in diameter.	Warm vegetation type: 4 live trees 10"+ 6 dead trees 15"+	17
51S	Retain DF and aspen. No exam data available for this unit. Informal walk through exams show small amount of DF.	Warm vegetation type: Trees >15" diameter unknown	19
52S	Retain DF and aspen. No exam data available for this unit. Informal walk through exams show small amount of DF.	Warm vegetation type: Trees >15" diameter unknown	94
58S	Retain subalpine fir and spruce. No exam data available for this unit. Informal walk through exams show small amount of fir and spruce.	Cool vegetation type: Trees >15" diameter unknown	49
61S	Retain DF. There are 17 live DF leave trees per acre that average 14.5 inches in diameter.	Warm vegetation type: 17 live trees 10"+ 5 live and dead trees 15"+	88
62S	Retain DF. There are 84 live DF leave trees per acre that average 9.1 inches in diameter.	Warm vegetation type: 32 live trees 10"+	36
69S	Retain DF and aspen. No exam data available for this unit. Informal walk through exams show small amount of DF.	Warm vegetation type: Trees >15" diameter unknown	2
72S	Retain DF and aspen. No exam data available for this unit. Informal walk through exams show small amount of DF.	Warm vegetation type: Trees >15" diameter unknown	28
73S	Retain DF and aspen. No exam data available for this unit. Informal walk through exams show small amount of DF.	Warm vegetation type: Trees >15" diameter unknown	64
74S	Retain DF and aspen. No exam data available for this unit. Informal walk through exams show small amount of DF.	Warm vegetation type: Trees >15" diameter unknown	74
76S	Retain DF and aspen. No exam data available for this unit. Informal walk through exams show small amount of DF.	Warm vegetation type: Trees >15" diameter unknown	32
77S	Retain DF and aspen. No exam data available for this unit. Informal walk through exams show small amount of DF.	Warm vegetation type: Trees >15" diameter unknown	16
78S	Retain DF and aspen. No exam data available for this unit. Informal walk through exams show small amount of DF.	Warm vegetation type: Trees >15" diameter unknown	23
79S	Retain subalpine fir and spruce. No exam data available for this unit. Informal walk through exams show small amount of fir and spruce.	Cool vegetation type: Trees >15" diameter unknown	31
Total acres of salvage clearcut of dead and dying lodgepole pine			**1,163**

DF: Douglas-fir
PP: ponderosa pine
LP: lodgepole pine
ES: Engelmann spruce
TPA: trees per acre
BA: basal area

Table E- 4. Prescribed burning unit description

Unit	Unit description	Acres
1B	Low elevation, dry forest, mostly DF with some PP and dead LP. Multi-layered with dense pockets of understory.	22
2B	Low elevation, dry forest, mostly DF with some PP, juniper and dead LP. Multi-layered with dense pockets of understory. DF defoliated by spruce budworm.	15
3B	Mid elevation, mixed conifer with mostly LP with DF; LP is dead and dying. Some spruce and aspen.	298
4B	Mid elevation, mixed conifer with mostly LP with DF; LP is dead and dying. Some spruce and aspen.	251
5B	Mid elevation, mixed conifer with mostly LP with DF; LP is dead and dying. Some WBP, spruce, subalpine fir and aspen. Most WBP occurs at upper end of unit in pockets, mostly dead from MPB, with WBP naturally regenerating in openings created by dead trees.	710
6B	Low elevation, dry forest, mostly DF with some PP, juniper and dead LP. Multi-layered with dense pockets of understory. DF defoliated by spruce budworm.	164
7B	Low elevation, dry forest with some grassy openings, mostly DF with some PP, juniper and dead LP. Multi-layered with dense pockets of understory. DF defoliated by spruce budworm.	298
8B	Low elevation, dry forest, mostly DF with some PP, juniper and dead LP. Multi-layered with dense pockets of understory. DF defoliated by spruce budworm.	232
	Total acres of prescribed burning treatments	**1,990**

DF: Douglas-fir
ES: Engelmann spruce
PP: ponderosa pine
TPA: trees per acre
LP: lodgepole pine
BA: basal area

Appendix F – Wildlife

Wildlife Considerations for Treatment Units

Table F- 1. Wildlife considerations for treatment units in the Flint Foothill Project

Unit Number	Unit within Travel Mgmt Area Closure	Haul/Access Roads with Travel Mgmt Restriction (Road ID)	Travel Mgmt Restriction Period	Raptor Nesting Restriction	Raptor Nesting Restriction Period	Comments
Proposed Salvage Units						
16S	X	78464	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
19S	X	73549	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
26S	X		Oct. 15 – Dec. 2			Haul unrestricted on 1544 Wildlife secure area Oct. 15 – Dec. 2
34S		78461	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
35S						Wildlife secure area Oct. 15 – Dec. 2
36S						Wildlife secure area Oct. 15 – Dec. 2
37S						
39S		5153, 78469, 78470	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
40S		5153	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
41S	X	UR8-257 (year round)	Oct. 15 – Dec. 2, Apr. 1 – June 15			Haul unrestricted on Rd 1557 Wildlife secure area Oct. 15 – Dec. 2

Unit Number	Unit within Travel Mgmt Area Closure	Haul/Access Roads with Travel Mgmt Restriction (Road ID)	Travel Mgmt Restriction Period	Raptor Nesting Restriction	Raptor Nesting Restriction Period	Comments
43S		5151	Year Round	Goshawk	Apr. 15 - Aug. 15	
44S		78472, 78475	Year Round			Wildlife secure area Oct. 15 – Dec. 2
45S		19755	Year Round			Haul unrestricted on Rd 636 Wildlife secure area Oct. 15 – Dec. 2
46S		1550, 78494	Oct. 15 – Dec. 2			Wildlife secure area Oct. 15 – Dec. 2
47S						Wildlife secure area Oct. 15 – Dec. 2
49S				Great gray owls	Mar. 15 - July 15	
50S	X		Oct. 15 – Dec. 2, Apr. 1 – June 15			Haul unrestricted on Rd 1544 Wildlife secure area Oct. 15 – Dec. 2
51S						
52S						
58S		78472, 78476	Year Round			Wildlife secure area Oct. 15 – Dec. 2
61S	X	78464	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
62S		5152	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
69S		19752	Year Round			Wildlife secure area Oct. 15 – Dec. 2
72S		8454	Oct. 15 – Dec. 2			Wildlife secure area

Unit Number	Unit within Travel Mgmt Area Closure	Haul/Access Roads with Travel Mgmt Restriction (Road ID)	Travel Mgmt Restriction Period	Raptor Nesting Restriction	Raptor Nesting Restriction Period	Comments
						Oct. 15 – Dec. 2
73S						
74S						
76S	X		Oct. 15 – Dec. 2			Haul unrestricted from Rd 1544 Wildlife secure area Oct. 15 – Dec. 2
77S		(UR8-284 year round); 1500	Sept. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
78S		(UR8-284 year round); 1500	Sept. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
79S						
Proposed Commercial Thinning Units						
6C	X	5023	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
8C	X	5023	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
10C	X		Oct. 15 – Dec. 2, Apr. 1 – June 15	Great Gray Owls	Mar. 15 - July 15	Haul unrestricted on Rd 1557 Wildlife secure area Oct. 15 – Dec. 2
11C	X	5023	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
12C	X	5023	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2

Unit Number	Unit within Travel Mgmt Area Closure	Haul/Access Roads with Travel Mgmt Restriction (Road ID)	Travel Mgmt Restriction Period	Raptor Nesting Restriction	Raptor Nesting Restriction Period	Comments
20C	X	8510	Oct. 15 – Dec. 2, Apr. 1 – June 15	Flammulated owls	May 15-August 15	Wildlife secure area Oct. 15 – Dec. 2
22C	X		Oct. 15-June 15			Haul unrestricted on Rd 707 Wildlife secure area Oct. 15 – Dec. 2
23C	X	5023	Oct. 15 – Dec. 2, Apr. 1 – June 15	Flammulated owls	May 15-August 15	Wildlife secure area Oct. 15 – Dec. 2
24C	X	8510	Oct. 15 – Dec. 2, Apr. 1 – June 15	Flammulated owls	May 15-August 15	Wildlife secure area Oct. 15 – Dec. 2
25C	X	78480	Oct. 15 – Dec. 2, Apr. 1 – June 15	Flammulated owls	May 15-August 15	Wildlife secure area Oct. 15 – Dec. 2
28C	X	78434	Oct. 15-June 15			Wildlife secure area Oct. 15 – Dec. 2
29C	X	78434	Oct. 15-June 15			Wildlife secure area Oct. 15 – Dec. 2
31C	X	78434	Oct. 15-June 15			Wildlife secure area Oct. 15 – Dec. 2
33C	X	78434	Oct. 15-June 15			Wildlife secure area Oct. 15 – Dec. 2
42C	X	78434	Oct. 15-June 15			Wildlife secure area Oct. 15 – Dec. 2
48C		(UR8-284 year round);1500	Sept. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
55C	X	5123	Oct. 15-June 15	Great gray owls	Mar. 15 - July 15	Wildlife secure area Oct. 15 – Dec. 2
56C		5123	Oct. 15-June 15	Goshawks	Apr. 15 - Aug. 15	Wildlife secure area Oct. 15 – Dec. 2

Unit Number	Unit within Travel Mgmt Area Closure	Haul/Access Roads with Travel Mgmt Restriction (Road ID)	Travel Mgmt Restriction Period	Raptor Nesting Restriction	Raptor Nesting Restriction Period	Comments
57C		5123	Oct. 15-June 15	Goshawks	Apr. 15 - Aug. 15	Wildlife secure area Oct. 15 – Dec. 2
59C	X	5123	Oct. 15-June 15	Great gray owls	Mar. 15 - July 15	Wildlife secure area Oct. 15 – Dec. 2
60C	X					Haul unrestricted on Rd 1557 Wildlife secure area Oct. 15 – Dec. 2
64C		5151	Year Round			Wildlife secure area Oct. 15 – Dec. 2
65C						
66C						
67C		78489; 8454	Oct. 15-June 15			Wildlife secure area Oct. 15 – Dec. 2
68C		666	Oct. 15-June 15	Goshawks	Apr. 15 - Aug. 15	Wildlife secure area Oct. 15 – Dec. 2
71C		8454	Oct. 15-June 15			Wildlife secure area Oct. 15 – Dec. 2
80C		5151	Year Round			Wildlife secure area Oct. 15 – Dec. 2
81C		5151	Year Round			Wildlife secure area Oct. 15 – Dec. 2
Seed Tree Units						
1ST	X	78480, 8615	Oct. 15 – Dec. 2, Apr. 1 – June 15	Great gray owl	Mar. 15 - July 15	Wildlife secure area Oct. 15 – Dec. 2
1ST	X			Flammulated owl	May 15-Aug. 15	
5ST	X	8615	Oct. 15 – Dec. 2,			Wildlife secure area

Unit Number	Unit within Travel Mgmt Area Closure	Haul/Access Roads with Travel Mgmt Restriction (Road ID)	Travel Mgmt Restriction Period	Raptor Nesting Restriction	Raptor Nesting Restriction Period	Comments
			Apr. 1 – June 15			Oct. 15 – Dec. 2
27ST	X	1522, 1522A, 5162, UR8-9020	Oct. 15 – Dec. 2, Apr. 1 – June 15	Goshawks	Apr. 15 - Aug. 15	Wildlife secure area Oct. 15 – Dec. 2
30ST	X	78434	Oct. 15-June 15			Wildlife secure area Oct. 15 – Dec. 2
32ST	X	78434	Oct. 15-June 15			Wildlife secure area Oct. 15 – Dec. 2
65ST		5152	Year Round			Haul unrestricted on Rd 1544
Proposed Precommercial Thinning Treatments						
1P	X	5023, 8506	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
2P	X	5023, 8615, 78479	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
8P	X	78495, 78585	Oct. 15 – June 15			
9P	X	78464	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
10P						Wildlife secure area Oct. 15 – Dec. 2
13P						
14P						
16P		5153	Oct. 15 – Dec. 2, Apr. 1 – June 15			

Unit Number	Unit within Travel Mgmt Area Closure	Haul/Access Roads with Travel Mgmt Restriction (Road ID)	Travel Mgmt Restriction Period	Raptor Nesting Restriction	Raptor Nesting Restriction Period	Comments
17P		5153	Oct. 15 – Dec. 2, Apr. 1 – June 15			
18P						Wildlife secure area Oct. 15 – Dec. 2
19P						Wildlife secure area Oct. 15 – Dec. 2
20P						
21P		78461	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
23P	X	78437	Oct. 15 – Dec. 2, Apr. 1 – June 15			Unit portion west of Rd 645 outside area closure; Access on Rd 645 unrestricted Wildlife secure area Oct. 15 – Dec. 2
25P	X	5153; 78469	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
36P						
39P						
41P	X	5023	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
42P	X	5023	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
45P		5153	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
Proposed Prescribed Burning						

Unit Number	Unit within Travel Mgmt Area Closure	Haul/Access Roads with Travel Mgmt Restriction (Road ID)	Travel Mgmt Restriction Period	Raptor Nesting Restriction	Raptor Nesting Restriction Period	Comments
Treatments						
1B (Low)						
2B (Low)						
3B (Mid)		666, 78608	Oct. 15 – Dec. 2, Apr. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
3B (Mid)		1500	Sept. 1 – June 15			
4B (Mid)		1500	Sept. 1 – June 15			Wildlife secure area Oct. 15 – Dec. 2
5B (Mid)						Wildlife secure area Oct. 15 – Dec. 2
6B (Low)						Wildlife secure area Oct. 15 – Dec. 2
7B (Low)	X	5162	Oct. 15 – Dec. 2			Wildlife secure area Oct. 15 – Dec. 2
8B (Low)	X	5161	Oct. 15 – Dec. 2			Wildlife secure area Oct. 15 – Dec. 2

Dates for LOP – hunting season 10/15 – 12/2 (Forest Travel map); winter range 12/2 – 5/15 (Forest Travel map); goshawk breeding season – 4/15 – 8/15 (USFWS R6 FWS, 2007); great gray owl breeding season 3/15 – 7/15; flammulated owl breeding season 5/15-8/15.

Wildlife Surveys

Surveys were done by Forest Service personnel across the project area, focusing on areas with proposed treatments and areas of suitable habitat based on species-specific habitat requirements. For example, flammulated owl surveys focused on areas proposed for treatment that included mature Douglas-fir; great gray owl surveys focused on units adjacent to open areas (meadows etc.); and goshawk surveys on historic nest sites. Attempts were made to follow up on reported raptor sightings; however these were often too late in the season to adequately survey, so special mitigation was included for those units (Wildlife project design features and mitigation measures, chapter 2).

Summer 2010

Black-backed woodpecker surveys

6-22-10: Units 15, 16 and 35. Detected three-toed woodpeckers in Unit 35. Units 10 and 11, drumming heard in both units but no visual for identification.

6-23-10: Unit 45. No woodpeckers noted. Unit 36, hairy woodpecker seen. Also did short survey to follow up on potential sighting north of unit 65 along Rd 5131. Only flickers detected.

7-1-10: units 27 and 43. Flicker, hairy woodpecker and sapsuckers seen.

Northern goshawk Surveys

7-1-10: Units 27 and 43. No goshawks detected.

7-13-10: Historic nest site survey, Emery Ridge. No goshawks detected.

7-14-10: Historic nest site survey, Crevice Creek. No goshawks detected.

7-14-10: Historic nest site survey, Blum Creek. No goshawks, but a pair of vocal red-tailed hawks detected.

7-15-10: Historic nest site survey, section 18. No goshawks detected.

7-20-10: Historic nest site survey, Gird Creek. Goshawk flew in, but nest not found.

7-20-10: Historic nest site survey, sec 6. Goshawk flew in, but nest not found.

7-21-10: Historic nest site survey, Dunkleberg. No goshawks detected.

7-21-10: Historic nest site survey, Forest Rose Mine. No goshawks detected.

Flammulated owl Surveys

6-14-10: Unit 1. Flam heard from second survey point. It was to the north, outside of the unit, and likely on adjacent private land.

6-14-10: Unit 25. Heard a great-horned and potential flam. Weathered out.

6-22-10: Unit 1. No flams but did see a great gray owl before dark. Attempted nest search but did not locate a nest.

6-22-10: Units 2-4. No flams detected.

6-23-10: Unit 27. No flams heard, one great-horned owl heard towards north end of unit.

6-23-10: Unit 25. Heard great gray owls and one long-eared owl. Not seen.

Summer 2011

Northern goshawk Surveys

7/19/2011. Dunkleberg historic nest revisit. Nest not used this year.

7/21/2011. Pioneer Gulch historic nest revisit. Nest not used this year.

8/2/2011. Follow up on reported goshawk sighting on Gird Creek Road (unit 68s accessed by this road). Goshawk nest found.

Flammulated owl Surveys

6/11/2011. Unit 01c. Flammulated owl survey, no responses.

7/12/2011. Unit 25c. Flammulated owl survey, flammulated and great gray owls seen.

7/13/2011. Unit 63c. Flammulated owl survey, no owls detected. Unit dropped.

7/13/2011. Unit 05c. Flammulated owl survey, no owls detected.

7/14/2011. Unit 20c/24c. Great gray owl and Flammulated owl surveys, no owls detected.

7/19/2011. Unit 20c/24c. Flammulated owl survey. Heard flammulated and great gray owls.

7/20/2011. Unit 20c. Flammulated owl survey, heard flammulated owls.

7/21/2011. Unit 23. Flammulated owl survey, heard flammulated owls.

7/26/2011. Unit 24c. Flammulated owl survey, could hear flamm from unit 20c.

7/26/2011. Unit 25c. Flammulated owl survey, heard flammulated owls.

7/27/2011. Unit 23c. Flammulated owl survey, heard flammulated owls.

Great gray owl Surveys

7/11/2011. Unit 01c. Great gray owl survey, no owls detected.

7/12/2011. Unit 05c. Great gray owl survey, no owls detected (did see three toed woodpecker)

7/14/2011. Unit 20c/24c. Great gray owl and Flammulated owl surveys, no owls detected.

7/18/2011. Unit 55c/59c. Great gray owl survey, unidentified owl seen, also pileated woodpecker

8/30/2011. Great gray owl seen in unit 10s. Confirmed by photos, too late in season for nest search.

9/8/2011. Adult and one fledged great gray owls (2 total) seen in unit 49S. Confirmed by photos. Too late in season for nest search.

Winter Nonmotorized Areas

The figure below displays the winter nonmotorized areas within the project area.

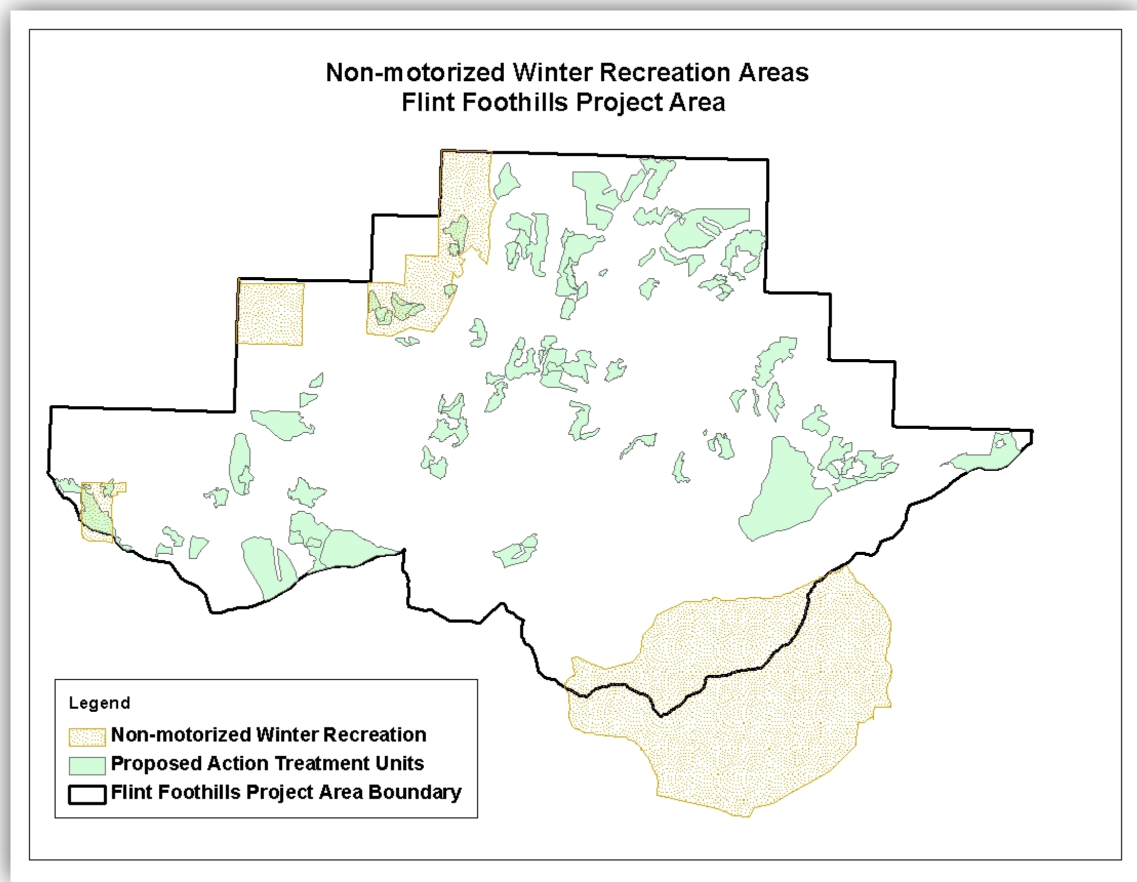

Figure F- 1. Nonmotorized winter recreation areas and proposed treatment units in the project area

Forest Plan TES Bird Nest Standard

Available references were reviewed to establish baseline limited operating periods and nest buffers. Site-specific conditions may warrant some deviation, but this provides a common starting point. When delineating a nest buffer on the ground, criteria that might be considered includes; homogeneity in the surrounding vegetation (species, age, size class etc.), the distance of the nest tree to motorized use or project activities, aspect and terrain of the stand; depending on the specific species being considered.

Table F- 2. Timing and nest buffers for TES active nests

Species	Breeding Season Limited Operating Period	Nest buffer
Flammulated owl	5/15 – 8/15	35 acres
Bald eagle	2/1 – 8/15	¼ mile visual buffer ½ mile in the absence of a visual buffer
Peregrine falcon	4/1 – 7/31	½ mile
Black-backed woodpecker	6/1 – 8/31	1 acre
Northern goshawk	4/15 – 8/15	40 acres
Great Gray Owl	3/15 – 7/15	30 acres

Active nests are those nests that are occupied during the year of implementation of activity at nest stand

Flammulated Owl

Wright et al. (Bitterroot) and numerous Linkhart papers (Colorado) were reviewed, but did not find information to help identify limited operating periods or nest buffers for this area. The following sources had some information.

McCallum (BNA 1994): early May for nesting from ne OR and BC; end of July for average fledging dates (5/1 – 7/30). Young stay within 100 m after fledging (328 ft) (area of 337,813 sq. ft. or 8 acres). Begin to attempt gleaning in 2nd week after fledging, independent after 30 days (end of August)

Hayward and Verner (1994): Appear to be tolerant to disturbance, maybe moderate tolerance to mechanical disturbance.

Reynolds and Linkhart (1987): CO, breeding adults located starting in early May, males arrive first, all territories occupied by 3rd week of May. Selected nest sites by late May. Male home ranges from 11-18 ha (27-44 acres). Young fledged in mid to late-July in CO. Owlets were independent by late August.

Linkhart 2001: flammulated owl fecundity is among the lowest and least variable of North American owls, few replacement clutches.

Goggans 1985: study in Oregon, Ponderosa pine, ponderosa pine/Douglas-fir, mixed conifer. Initial nest occupancy 12 June, mean fledging dates 26-28 July. Critical period is June 1 to July 31. 10 ha or 25-acre male home range.

Based on all of these sources, 35 acres was selected for the nest buffer as it includes the nesting home range and the area where fledglings are found immediately after fledging while they are flightless and vulnerable. There was no information found on a buffer for disturbance, these owls appear to be fairly tolerant of disturbance. The limited operating period is based on Reynolds and Linkhart – territories occupied by 3rd week of May; and mid- August date accommodates the period post-fledging when owlets are still found in the vicinity of the nest (BNA). After that they can fly and forage and are more independent.

Bald Eagle

BEWG, 2010 – An addendum was prepared for the Montana Bald Eagle Management Guidelines (1994) to address recent changes in federal bald eagle regulations. This addendum includes recommended guidelines. The recommended primary seasonal restriction is from approximately February 1 through August 15th and applies to construction, maintenance and forest management activities. The visual buffer recommendation is to maintain existing visual buffers within ¼ mile of nest sites or ½ mile in the absence of a visual buffer.

Peregrine Falcon

Peregrine Fund, 1995. Occupancy in Montana begins April 1 and fledging ends by late July.

Peregrine Falcon Recovery Team, 1977 – Prohibit disturbance and human activity (above those that occurred historically) within a 0.50 mile of the nest between February 1 and August 1.

Based on the information found, April 1 to July 31 is the limited operating period, based on occupancy dates in Montana. The buffer of 0.50 mile is consistent with the 1977 Recovery Plan.

Black-backed woodpecker

Bonnot et al. 2006 – recommends no harvest June 1 to August 31 to prevent nests from being destroyed. Identify a "nest area" as 12.5 m radius around the nest; this comes out to less than 1 acre.

No further information on a nest buffer, so fall back to the 1 acre nest area. Frequency of use of previous year's nests by black-backed woodpeckers was not found. This would likely apply if a nest happened to be found immediately prior to operations (most likely in a burned area).

Northern Goshawk

R1 Overview 2009 (USDA Forest Service 2009) – This document reviewed the most current literature and provides the best currently available information for determining limited operating periods and nest buffers. See that document for more on literature cited.

Pairs usually return by March or early April. Clough (west central Montana, Flint Creek Mountains, BDNF best available science for this area) noted beginning of incubation on May 5 and found fledged young capable of sustained flight by Aug 10. Kennedy et al found that during the fledgling dependency period, nearly 90% of the juveniles locations were within 656 ft. of the nest tree, the approximate radius of a 30-acre circular nest area. Fledgling movements outside of nest stand begin in mid-August. End of breeding season noted as August 15th.

Nest area – mature, closed canopies (50-90%) and open understories. Average size varies, Reynolds et al (1992) recommended 30 acres; Clough reported 40 acres in west central Montana.

In the Considerations for Project Analysis section they recommend a minimum 40-acre nest stand, but actual shape and size may vary based on the size of the stand, topography or other local conditions. They also recommended timing restrictions from April 15 through August 15 in the PFA.

Based on the above information, a 40-acre buffer was selected as it includes all of the nest area noted by Clough, and includes the area around the nest tree where juveniles would be found and agrees with the Considerations section of the Overview. April 15 was selected because that is close to when goshawks began incubation in the Flint Creek Mountains and agrees with the Considerations section of the Overview; and August 15 as young are capable of sustained flight and move out of nest stand by mid-August based on Clough (as noted in the Overview).

Great Gray Owl

Quintana-Coyer et al 2004 (Pacific Northwest) – begin incubation March 15, fledging July 15

MFWP Montana Field Guide – no information available from Montana, but information from other areas shows that they begin nesting in March or April

Bull and Duncan 1993 (BNA) – Egg laying in March in OR and Manitoba, late March in CA, early May in ID and WY. Late-March thru end July displayed on Breeding Cycle graphic.

Bull and Henjum -1990: Oregon egg-laying March 17 – April 17, young left nest by June 19. Males continued to feed for 3 months after leaving nest (mid-Sept). Defend only immediate nest site. First week after leaving the nest, the young stay within 200 m of nest (656 ft., area of 31 acres). Can fly within 2 weeks of leaving nest but use stands with high canopy cover.

Based on all of these sources, 30 acres was selected for the nest buffer as it includes the area where fledglings are found immediately after fledging while they are flightless and vulnerable (no information found on a buffer for disturbance). The limited operating period beginning in mid-March is consistent with the majority of these sources; and mid- July date accommodates the period post-fledging when owlets are still found in the vicinity of the nest. After that they can fly and forage and are more independent.

Monitoring – Wildlife Analysis on the Beaverhead-Deerlodge National Forest

Art Rohrbacher, August 2011

This report is a monitoring review of new information and recent public comment relating to the 2009 Forest Plan and Final Environmental Impact Statement wildlife analysis.

2009 Forest Plan and Final Environmental Impact Statement

The Final Environmental Impact Statement (FEIS) and the 2009 Forest Plan identify spatial and temporal scales to provide for wildlife security. Wildlife, in the context of security, includes elk. These spatial and temporal scales are: a) the BDNF ***landscape*** for roads that could be open anytime during the year and b) the 2006 Montana ***FWP hunting districts*** for roads that could be open during the fall general hunting season (10/15 through 12/1).

As described in table 14 of the 2009 Forest Plan, open motorized road and trail densities (OMRTD) during the fall general hunting season are notably lower than the desired OMRTD for the BDNF landscapes during the remainder of the year. This is to provide more security for wildlife during the fall general hunting season, recognizing the highest concentrated recreation use on the BDNF occurs during the fall general hunting season. Opportunities for fair chase hunting are still plentiful across the BDNF, as all areas are open for hunting on the BDNF with the exception of developed recreation and administrative sites.

Open motorized road and trail density metrics and geographic scales are identified in the 2009 Forest Plan and are appropriate for both Forest Plan NFMA and project-level analyses. Managing OMRTD is the most direct method of creating, maintaining and monitoring security for wildlife.

Consideration of New Information and Recent Public Comments

Recent public comments to BDNF project-level vegetation management proposals have requested project-level analyses for elk habitat based on metrics described in Hillis et al. 1991. Habitat management parameters suggested by Hillis et al. (1991) are:

- Forested cover blocks at least 250 acres in size,
- A distance of at least 0.5 miles from an open road
- A spatial allocation of 30 percent of the analysis area or more.

Hillis et al. (1991) recommend that vegetation density, topography, road access, hunter-use patterns and elk movements be considered. We note, however, that Hillis et al. (1991) do not define or recommend the size of the analysis area in which to analyze the 30 percent forest cover. Further, there is little or no information that the analysis parameters suggested by Hillis et al. (1991) are successful in moderating hunting season mortality rate. In effect, Hillis provides no insight on the statistical significance of various habitat factors for maintaining elk populations that are routinely hunted. Hayes et al. (2002) pointed out that while Hillis et al. (1991) reviewed the literature and formalized the conceptual model as a set of security habitat management factors, they did not directly or quantitatively link levels of these variables to a numerical hunting season mortality rate. Furthermore, Hillis's research was based west of the Continental Divide and the applicability to the eastside forests is uncertain.

Recent public comments have also requested analyses of hiding cover patches at least 600 feet wide for project-level vegetation management proposals. However, science shows, rather than hiding cover, security based on OMRTD, particularly during hunting season, is key to elk population numbers.

Security is the protection inherent in any situation that allows elk to remain in a defined area despite an increase in stress or disturbance associated with the hunting season or other human activities. Security is a state of being, a condition or a functional concept most important when viewed in relation to the hunting season. Components of security may include vegetation, topography, aerial extent of habitat, road density, distance from roads, size of vegetation blocks, hunter density, season timing, and land ownership.

The BDNF uses OMRTD as the principle metric for analysis of potential effects of management activities to secure areas for wildlife at all spatial scales. This principle is well supported by the literature. The benefit of using OMRTD is that miles or road and trail are known and, for the most part, under the direct control of the Forest Service. Conversely, population numbers of elk are largely driven by harvest opportunity (upward of 90 percent of elk mortality stems from human hunting), and the management of harvest opportunity is the responsibility of Montana Fish, Wildlife and Parks. Likewise, vegetation- the key component of cover - is subject to impacts that are largely outside of the actual control of the Forest Service, such as insects, disease and wildfire.

There is substantial rationale for focusing on motorized access as the principle component of wildlife security. For example, numerous authors have described reductions in the effectiveness of elk habitat with increasing road and trail density. Lyon et al. (1985 p.6) summarized:

> *It has been repeatedly documented, in Montana and throughout North American elk range, that vehicle traffic on forest roads evokes an avoidance response by elk. Even though the habitat near forest roads is fully available to elk, it cannot be effectively utilized. Declines in elk use have been detected as far as 2 miles from open roads, but significant reductions in habitat effectiveness are usually confined to an area within a half mile. The loss of habitat effectiveness has been shown to be greatest near primary roads and least near primitive roads, greatest where cover is poor and least where cover is good, and greater during the hunting season than at any other time of the year. As a general average, habitat effectiveness can be expected to decline by one-fourth when road densities are 1 mile per section and by one-half when road densities are 2 miles per section.*

Several different data sets produced similar models to evaluate the impacts of route density on ungulates. Thomas et al. (1979 p.122) developed a habitat effectiveness/road density model that numerically corresponds to modeled habitat effectiveness described in the preceding paragraph. In essence, these models predict that the degree of selection of habitat by elk increases as the distance from open roads increases. This general premise is supported by later work by Rowland et al. (2000 p. 680).

Christensen et al. (1993) synthesized available habitat management concepts in Elk Management in the Northern Region: Considerations in Forest Plan Updates and Revisions. Christensen et al. (1993) stated “Roads are undoubtedly the most significant consideration on elk summer range” and reinforced that elk security is the primary concern in elk habitat management. Also, Christensen et al. (1993) directly equates habitat effectiveness to road density recommending “[f]or areas where elk are one of the primary resource considerations habitat effectiveness should be 50 percent or greater” equating to an open road density of no more than approximately 1.7 mi/sq.mi.

Wisdom et al. (2004) is one of the primary references used in the development of the 2009 Forest Plan. Wisdom et al. (2004) demonstrated a 43 percent probability (R=36% - 49%) that ATV use produces a threat response in elk at distances of 500 meters, and that the threat response declined notably when ATVs were 1000 meters distant.

There are a number of other authors who identify open motorized route density as the key consideration in elk security. Hayes et al. (2002) determined hiding cover and *interior hiding cover*[2] were not statistically significant variables influencing elk behavior in their northern Idaho elk study. In addition, Hayes et al. (2002) found that four of the 36 independent variables in their extensive elk study had significant univariate relationships with harvest mortality. These four significant independent variables were: total road density, hunting season structure, aspect, and percent moist shrubfield. Management of road density is the variable most readily changed by Forest Service management.

In South Dakota, Rumble and Gamo (2011) found that elk used ponderosa pine stands with lower stem density (and hence lower *standing visual obstruction*= hiding cover), than sites chosen at random:

> *"We were surprised that sites selected by elk had less hiding cover than random sites. Even though the Black Hills have extremely high road densities (~3.2km/km2* **-***5.1 mi/sq mi 1996 Land and Resource Management Plan, BHNF, Custer, SD), most observations of radio-collared elk in ponderosa pine occurred in sites that provided only 50–60% obstruction of a standing elk at 61 m, which was less cover than was available at random sites in ponderosa pine stands with =70% overstory cover.."*

This 50% obstruction is a marked contrast to the 90% obstruction used in the old Beaverhead (1986) and Deerlodge (1987) forest plans. This indicates that 90% hiding cover is not a determining factor for ascertaining elk security in the Black Hills.

Hayes et al. (2002) note:

> *"Unsworth et al. (1993) is the only study to establish a quantitative link between habitat characteristics and elk hunting season mortality rates in a multivariate context...Their model predicts increasing elk mortality with increases in open road and hunter density, and decreases in elk mortality as topography becomes more dissected. Vegetation variables such as hiding cover were not significant in the model developed by Unsworth et al. (1993).*
>
> *"The influence of habitat on elk hunting season mortality has been modeled conceptually for many years (Hieb 1976, Thomas 1991). Hillis et al. (1991) reviewed the literature and formalized the conceptual model as a set of security habitat management guidelines. They defined security areas as nonlinear blocks of hiding cover 101.2 ha and 0.8 km from any open road. However, they did not directly or quantitatively link levels of these variables to a numerical hunting season mortality rate."*

Unsworth et al. (1993) specifically note:

> *We are not aware of an elk population that is hunted (except those that are hunted under a very limited number of controlled permits) where it has been shown that environmental or*

[2] Hayes et al. (2002) developed *interior hiding cover* by constructing an interior polygon on an area mapped as "cover" and considered this inner polygon as potentially higher in habitat value that the area surrounding it.

habitat factors are limiting the male cohorts of the populations. Habitat is definitely important to the long term viability of elk populations, but we believe that elk populations are more likely to be controlled by harvest than by limits in cover or forage. In most years, hunters, their efficiency modified by road density and topography, control elk populations.

Conclusion:

The import of this discussion is that the 2009 Forest Plan emphasis on road density for secure areas for all wildlife is a valid metric for analyzing project level effects to elk with something that the Forest Service can manage – open motorized roads and trails. The authors quoted above directly link to Christensen et al. (1993), specifically the significance of roads in elk habitat management. Tables 13 and 14 of the 2009 Forest Plan reflect this consideration. Cover as noted in Hayes (2002), Unsworth (1993) is not a significant metric in elk analysis. The work of Ramo and Gumble (2011) showing elk selecting for more open habitats in the Black Hills with road densities at 5.1 miles /sq mile appear to support that hiding cover is not significant.

The overarching question regarding elk security is fundamentally tied to predation by man during the hunting season. Hayes et al. (2002) and Unsworth et al. (1993) both determined that vegetation is not a limiting factor for populations of hunted elk. Table 1 displays forested cover in large blocks for each hunting district based on a slightly modified Hillis buffer (1/3 mile versus 1/2 mile from open motorized routes). ***Particularly noteworthy is the wide variability of Forest Service ownership of large cover blocks.*** While elk do not reside exclusively on National Forest lands, they are widespread as shown in figures 1 and 2. The State Elk Plan (2004) routinely credits the importance of National Forest lands for maintaining elk. Populations for hunting districts that encompass portions of the BDNF are currently at State plan objectives (table 1). There is no information that the variability in forested cover on National Forest lands is a limiting factor on southwest Montana elk populations.

Table 1. BDNF Hunting District Ownership and Forested Cover Blocks

Hunting District Number	Total Acres	BDNF Acres	Percent of Hunting District in BDNF ownership	Forested Cover Acres in 250-acre or more blocks @ 0.33-mile buffer. No restriction on forest cover type	Forested cover Percent NF Acres in 250 ac or more blocks- No cover type restriction @ 0.33-mile buffer/	BDNF Cover blocks as Percent of Entire Hunting District
210	312773	88100	28%	24489 acres	28 %	7%
211	212424	194762	92%	95009	49	45
212	353307	176672	50%	47283	27	14
213	140784	70076	50%	13774	20	10
214	122547	69629	57%	15774	23	13
215	368284	80507	22%	11570	14	3
216	189730	70536	37%	25043	36	13
300	155930	76757	49%	10490	14	7
302	199862	71158	36%	6087	9	3
311	560789	2333	0%	1512	65	0
318	176143	143080	81%	26573	19	15

Hunting District Number	Total Acres	BDNF Acres	Percent of Hunting District in BDNF ownership	Forested Cover Acres in 250-acre or more blocks @ 0.33-mile buffer. No restriction on forest cover type	Forested cover Percent NF Acres in 250 ac or more blocks- No cover type restriction @ 0.33-mile buffer/	BDNF Cover blocks as Percent of Entire Hunting District
319	287187	182093	63%	67230	37	23
320	267907	85369	32%	22638	27	8
321	499708	310633	62%	112871	36	23
323	121403	99559	82%	43428	44	36
324	301004	175920	58%	61446	35	20
327	450669	128022	28%	36885	29	8
328	298943	124636	42%	34264	27	11
329	440851	140405	32%	51582	37	12
330	209103	70875	34%	23114	33	11
331	490828	296690	60%	87687	30	18
332	392625	287158	73%	140104	49	36
333	343158	102151	30%	27100	27	8
340	543562	108266	20%	30034	28	5
341	109927	37747	34%	8009	21	7
350	225069	168784	75%	70288	42	31
360	284617	70977	25%	50407	71	18
362	197754	53603	27%	29418	55	15
370	118282	42083	36%	16319	39	14
TOTAL	**8,375,170**	**3,528,581**	**42%**	**1,190,428**	**33.7%**	**14%**

We can discern no correlation to cover and hunter success (lack of security) when comparing table 1and table 2.

Table 2. Montana FWP elk harvest and hunter success on hunting units encompassing the BDNF

BDNF Hunting Unit	2004 Total Harvest/% Success	2005 Total Harvest/% Success	2006 Total Harvest/% Success	2007 Total Harvest/% Success	2008 Total Harvest/% Success	2009 Total Harvest/% Success	2010 Total Harvest/% Success
210	247/ 17	384/ 26.7	315/ 24.1	278/20.6	185/14.1	220/ 15.8	261/ 19.9
211	139/ 22.4	113/ 23.5	155/ 36.1	86/ 17.7	51/ 12.1	48/ 13.3	84/ 23.2
212	287/ 16.1	363/ 22.5	398/ 24.8	313/ 19.3	269/ 14.0	362/ 19.6	379/ 20.7
213	174/ 25.1	188/ 28.5	158/ 27.2	232/ 35.8	75/ 13.1	175/ 24.5	225/ 31.4
214	58/ 8.3	141/ 21.1	89/ 18.2	68/ 11.6	52/ 10.8	61/ 10.3	58/ 10.4
215	249/ 13.7	363/ 22.4	382/ 21.0	320/ 17.4	356/ 17.3	441/ 21.0	533/ 23.6
216	70/ 11.7	122/ 24.1	99/ 24.4	76/ 16.5	51/ 13.5	42/ 10.3	59/ 14.2
300	259/ 24.8	219/ 24.0	248/ 31.9	341/ 30.6	560/ 33.7	373/ 27.4	278/ 23.6
302	136/ 17.7	147/ 26.7	198/ 29.3	187/ 27.8	268/ 30.6	168/ 21.5	191/ 25.4
311	268/ 24.3	187/ 22.3	194/ 24.7	283/ 31.0	132/ 16.3	175/ 20.2	255/ 30.3

BDNF Hunting Unit	2004 Total Harvest/% Success	2005 Total Harvest/% Success	2006 Total Harvest/% Success	2007 Total Harvest/% Success	2008 Total Harvest/% Success	2009 Total Harvest/% Success	2010 Total Harvest/% Success
318	94/ 9.5	173/ 19.5	145/ 17.0	102/ 11.3	126/ 13.7	183/ 19.4	227/ 17.8
319	344/ 14.2	546/ 26.2	220/ 14.0	303/ 18.6	174/ 11.7	196/ 14.5	139/ 13.7
320	204/ 17.9	292/ 24.0	272/ 24.8	319/ 23.6	332/ 22.2	343/ 25.0	223/ 17.8
333	115/ 13.2	194/ 21.5	102/ 11.9	155/ 15.0	154/ 14.3	143/ 15.9	144/ 16.8
321	353/ 16.6	399/ 23.2	329/ 24.3	294/ 17.7	365/ 20.4	312/ 16.6	283/ 20.3
323	284/ 20.8	249/ 26.7	141/ 16.0	239/ 18.6	202/ 16.7	160/ 13.4	175/ 18.2
324	489/ 20.3	366/ 22.8	253/ 22.0	377/ 22.5	444/ 25.2	274/ 18.9	257/ 21.0
327	463/ 23.2	248/ 18.9	154/ 18.6	265/ 21.1	416/ 28.8	183/ 16.1	183/ 18.4
330	299/ 16.7	270/ 19.9	154/ 15.4	317/ 24.7	280/ 20.6	177/ 16.7	156/ 14.6
328	250/ 22.7	233/ 30.9	210/ 31.4	205/ 25.9	192/ 23.4	197/ 24.6	134/ 24.4
329	360/ 16.0	510/ 30.4	297/ 23.2	363/ 24.8	238/ 18.4	357/ 24.4	260/ 22.4
331	323/ 12.5	448/ 21.7	234/ 13.7	299/ 18.5	142/ 9.2	240/ 15.4	251/ 16.0
332	293/ 14.6	476/ 31.1	192/ 16.7	243/ 23.7	152/ 14.3	218/ 19.8	246/ 21.7
340	204/ 13.2	358/ 22.7	301/ 18.0	253/ 16.6	312/ 19.3	298/ 16.6	309/ 17.2
350	74/ 9.1	125/ 15.3	114/ 13.8	67/ 7.2	114/ 13.0	114/ 11.9	164/ 5.7
370	69/ 12.8	95/ 18.3	129/ 22.8	109/ 15.4	92/ 13.7	115/ 14.7	101/ 15.7
341	75/ 7.4	223/ 27.2	113/ 15.4	84/ 15.1	46/ 7.7	56/ 10.0	74/ 13.7
360	498/ 26.5	510/ 28.2	593/ 28.6	576/ 27.2	682/ 25.1	535/ 22.6	639/ 28.5
362	368/ 30.8	353/ 33.7	165/ 22.8	218/ 24.7	314/ 28.5	226/ 24.9	255/ 27.4
Total Harvest	**7046**	**7865**	**6354**	**6972**	**6276**	**6392**	**6543**

Review of distribution maps from Montana Fish, Wildlife, and Parks indicates elk are well distributed across the entire forest (Figures 1, 2, and 3).

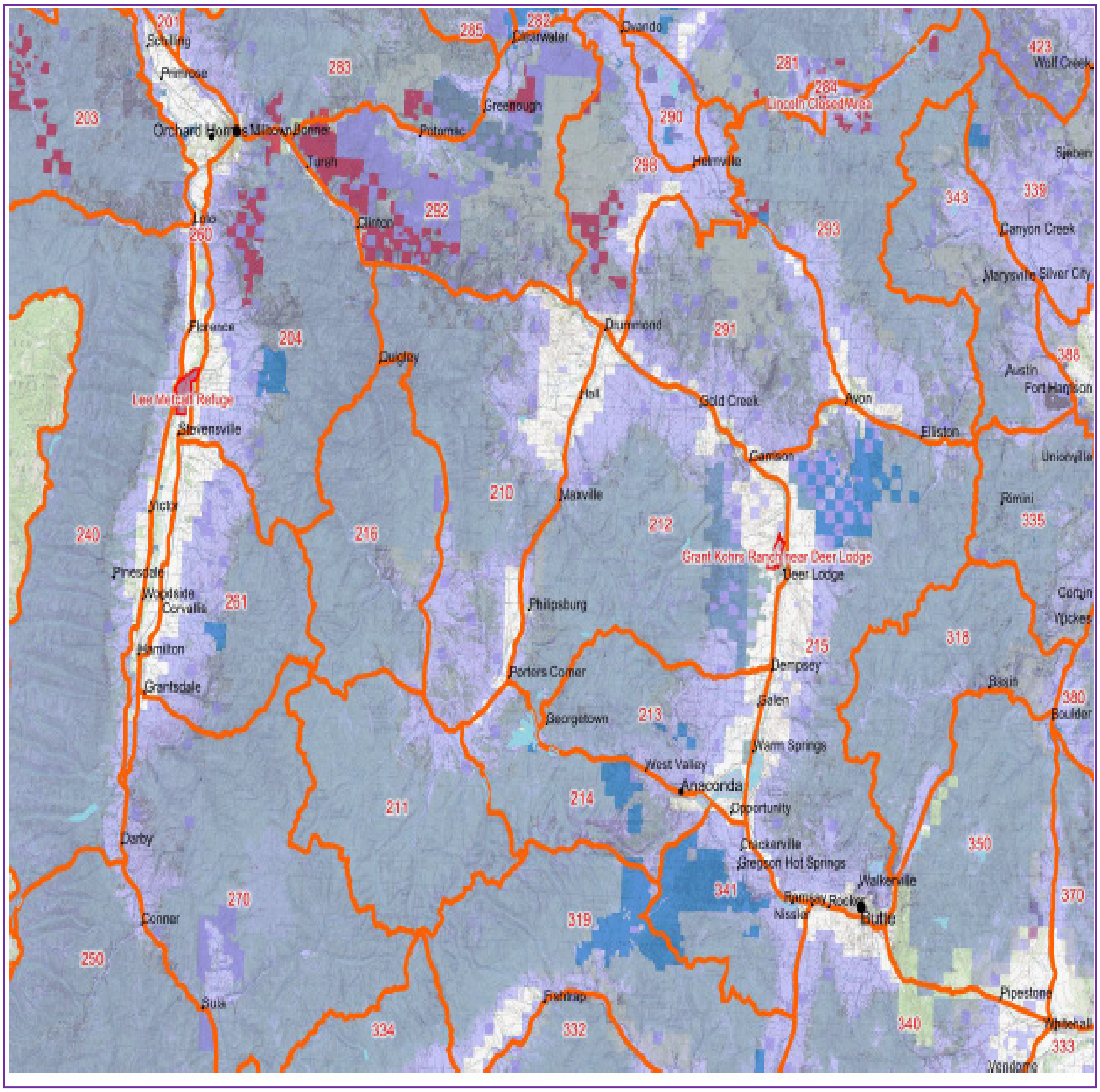

Figure F-2. Montana FWP Region 2 Elk Distribution

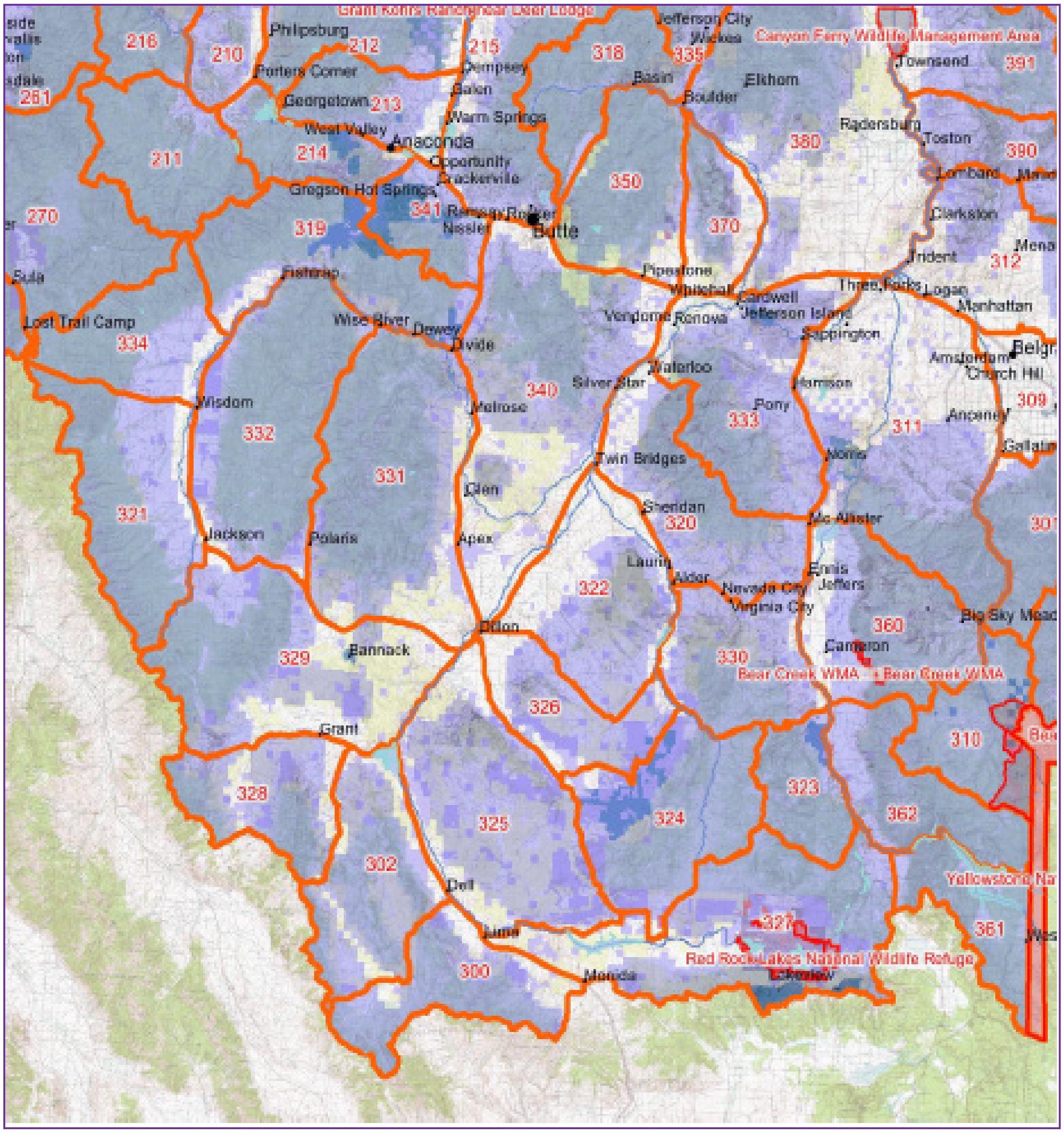

Figure F-3. Montana FWP Region 3 Elk Distribution

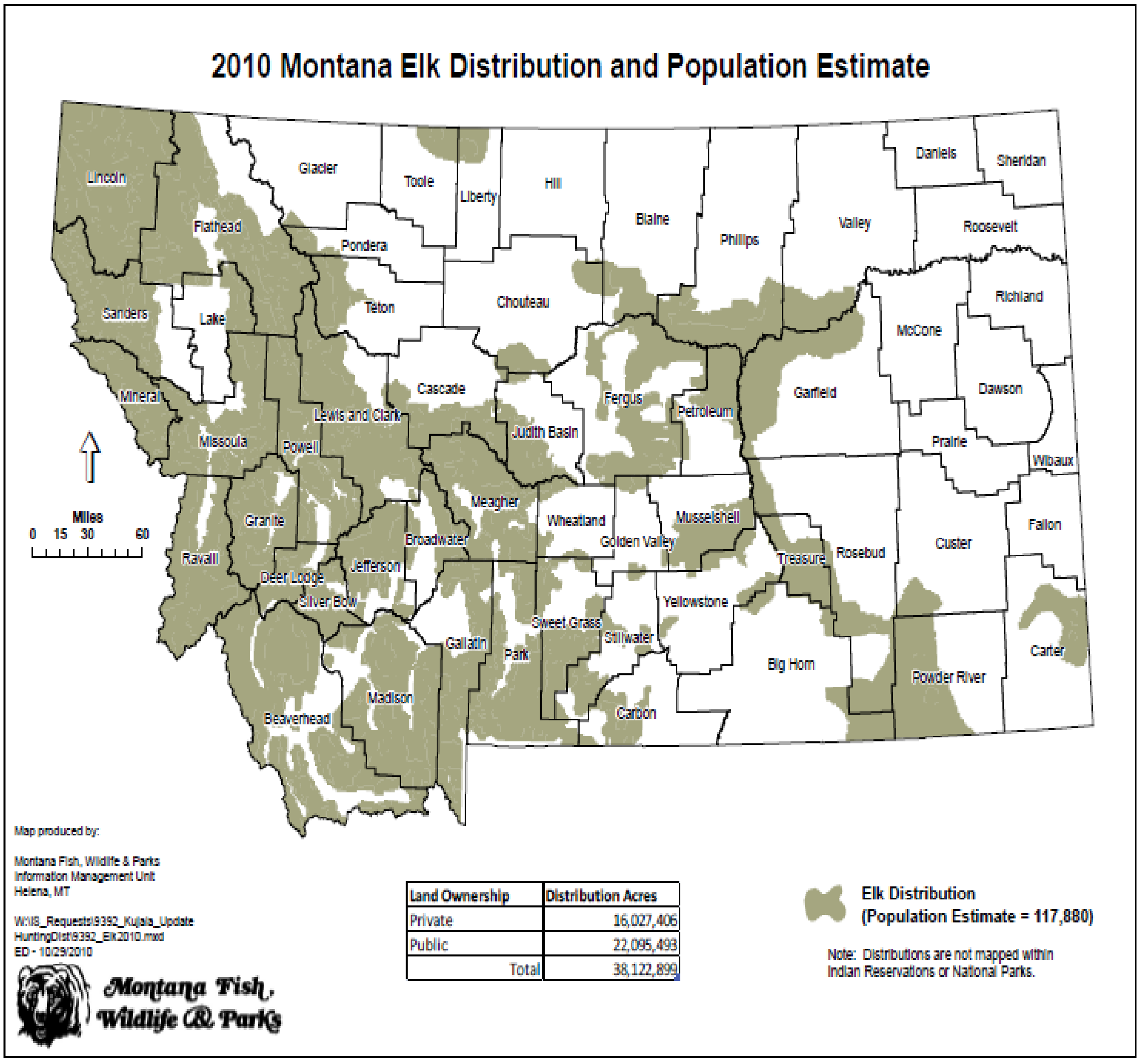

Figure 3. Montana elk distribution and population estimate

Public comments concerning thermal cover for elk have also been received for vegetation management proposals. Thomas et al. (2005) summarized recent work on thermal cover for elk:

> *The question of whether elk require or benefit from thermal cover was addressed in an experimental study at Kamela (Cook et al. 1998). Here, the nutritional condition of tractable elk maintained in pens was monitored in relation to varying amounts of thermal cover and no cover. Results, which detected no positive physiological benefits to elk from the presence of thermal cover, have changed managers' thinking about elk-cover relations (Cook et al. 2004a).*

Cook et al. 2005 note:

> *"Micro-weather characteristics measured during the study demonstrated that forest canopy reduced wind speed, reduced solar radiation flux during the day, and increased net radiation flux at night. They indicated little to no effect of forest canopy on ambient temperature or relative humidity.*

Evidence of support from habitat selection studies is only inferential (Riggs et al. 1993), and there is virtually no support for the thermal cover hypothesis from experimental research specifically designed to establish cause-and-effect relations.

No positive effects of thermal cover on elk were documented during any of the four winter experiments. But there were significant differences in body mass and body condition dynamics among cover treatments. Generally, elk in the dense forest stands lost the most mass and fat, elk in clearcuts lost least mass and fat, whereas mass and fat loss of elk in the moderate cover and combination cover units were intermediate.

During the two summer experiments, no significant differences were found in body mass, fat gain, or activity patterns among the four cover treatments. Elk in clearcuts and moderate cover treatment units consumed more water than did elk in dense cover units, however.

The BDNF recognizes habitat for elk in Oregon differs somewhat from that in southwest Montana. None the less, Cook et al. (2005) constitute experimental data from real elk that test the hypothesis of the value of thermal cover. Based on thorough review of Unsworth et al (1993), Hayes et al (2002) , Cook et al (2005), Rumble and Gamo (2011), which are the best available science postdating Hillis (1991) , forested cover for both hiding and thermal benefits are not significant metrics for elk analysis.

The use of road densities for elk analyses at all scales is appropriate. All elk on the BDNF are subject to hunting pressure which cannot be controlled by the Forest Service. As noted at Hayes et al (2002), open road density is the only significant variable that can be managed by the Forest Service for a <u>hunted</u> population. Road density management is being accomplished under the Forest Plan. Season of use and hunter densities (tag numbers) can be managed by Montana Fish, Wildlife, and Parks.

It should be noted that southwest Montana elk populations meet the State elk plan objectives at the forest scale and at virtually all of the hunting districts for project analysis (Table 3). With widespread distribution and no population deficiencies related to State objectives, elk constitute a robust presence on the BDNF.

Table 3. Montana Fish Wildlife and Parks Elk Objectives compared to Population Estimates

BDNF Hunting Districts	2005 FWP State Elk Plan Objective ± 20%	FWP 2003 Population Estimates ± 10%	FWP 2006 Population Estimates ± 10%	FWP 2007 Population Estimates ± 10%	FWP 2008 Population Estimates	FWP 2010 Population Estimates
210	2500	1043	952	1020	1391	1644
211	600	679	485	262	135	1125
212	850	1100	1074	1494	1825	2504
213	650	401	689	484	660	1325
214	200	309	270	284	331	400
215	1000	736	1144	1234	1502	2145
216	325	457	288	473	140	314
300	700-900	615	1137	1450	1883	806
302	550-700	399	736	956	1195	783
311	2700	2096	3100	3000	2620	2620
318	500	366	383	535	656	519

BDNF Hunting Districts	2005 FWP State Elk Plan Objective ± 20%	FWP 2003 Population Estimates ± 10%	FWP 2006 Population Estimates ± 10%	FWP 2007 Population Estimates ± 10%	FWP 2008 Population Estimates	FWP 2010 Population Estimates
319	1100 Max	1515	936	819	911	854
320 333	1000 for both	1130 549	942 470	745 477	954 859	1433 - at objective per FWP
321	None	No winter elk	No winter elk	No winter elk	No estimate	No estimate at objective
323 324 327 330 Total	Gravelly EMU Total = 7000	3119 3114 No winter elk 1830 (8063)	2682 2500 No winter elk 1132 (6314)	2265 1928 No winter elk 1116 (5309)	2268 2608 No estimate 1328 (6204)	No separate estimates – At objective per FWP
328	550-700	574	650	635	620	643
329	900 Max	582	683	727	766	(273 partial survey); at objective
331	1400 Max	1250	896	1085	773	869
332	900 Max	506	600	376	588	568
340 350 370	1600 combined for all	219 602 330 (1151)	557 268 192 (1017)	839 500 (1339)	423 529 529 (1481)	1915 for all; at objective
341	600 Max	669	494	272	166	416
360	2200	4555	1914	1661	2494	1090
362	2500	1159	3629	3845	3524	4203
TOTAL	**30,575**	**28,074**	**28,803 stable**	**28,482 stable**	**31,925 (increasing)**	**31,305 stable to increasing (above total objective)**

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Northern Rockies Lynx Management Direction - Standards & Guidelines Consistency Evaluation Table for Project Specific Activities

May 23, 2008

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Flint Foothills Project

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Attachment A

Notes: (1) For those areas identified as occupied lynx habitat in the Occupied Mapped Lynx Habitat Amendment to the Canada Lynx Conservation Agreement (USDA Forest Service et al. 2006), management direction are the standards and guidelines displayed below. As stated in the ROD (p. 29) unoccupied forests should consider this management direction. (2) Where superscript numbers (43) appear, refer to the Glossary definitions on pages 11-15.

Table F- 2. Standards & guidelines for lynx management consistency evaluation table for project specific activities

Northern Rockies Lynx Management Direction	Is direction applicable to this project and has it been met (Yes or No and Met or Not Met)? Where direction is applicable but has not been met, explain the reason(s).
ALL MANAGEMENT PRACTICES AND ACTIVITIES (ALL) *The following objectives, standards and guidelines apply to management projects in lynx habitat in lynx analysis units (LAU) and in linkage areas, subject to valid existing rights. They do not apply to wildfire suppression, or to wildland fire use*	
Standard[43] ALL S1 New or expanded permanent developments[33] and vegetation management projects[48] must maintain[26] habitat connectivity[16] *in an LAU[21] and/or linkage area[22]*.	Habitat connectivity will be maintained within the LAUs and across the analysis area. Units have forested cover around their perimeter; units will have snags and downed logs retained to meet Plan direction; and understory vegetation will increase with increased sunlight.
Guideline[15] ALL G1 Methods to avoid or reduce effects on lynx should be used when constructing or reconstructing highways[18] or forest highways[12] across federal land. Methods could include fencing, underpasses or overpasses.	Not applicable
Standard LAU S1 *Changes in LAU[21] boundaries shall be based on site-specific habitat information and after review by the Forest Service Regional Office.*	Not applicable
VEGETATION MANAGEMENT PROJETS (VEG) *The following objectives, standards and guidelines apply to vegetation management projects in lynx habitat in lynx analysis units (LAU). With the exception of Objective VEG O3 that specifically concerns wildland fire use, the objectives, standards and guidelines do not apply to wildfire suppression, wildland fire use, or removal of vegetation for permanent developments like mineral operations, ski runs, roads and the like. None of the objectives, standards, or guidelines apply to linkage areas.*	

Northern Rockies Lynx Management Direction	Is direction applicable to this project and has it been met (Yes or No and Met or Not Met)? Where direction is applicable but has not been met, explain the reason(s).
Standard VEG S1 – Stand initiation structural stage limits Standard VEG S1 applies to all vegetation management[48] projects that regenerate[37] timber, except for fuel treatment[13] projects within the wildland urban interface (WUI) [49] as defined by HFRA, subject to the following limitation: Fuel treatment projects within the WUI that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 6 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest). For fuel treatment projects within the WUI see guideline VEG G10. The Standard: Unless a broad scale assessment has been completed that substantiates different historic levels of stand initiation structural stages[44] limit disturbance in each LAU as follows: If more than 30 percent of the lynx habitat in an LAU is currently in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat, no additional habitat may be regenerated by vegetation management projects.	Applies and is met. None of the LAUs have had more than 14% regeneration harvest since the 1960s. Acres of past regeneration harvest by LAU range from 5-14%. See Table in Wildlife Specialist Report.
Standard VEG S2 – Limits on regeneration from timber mgmt. projects Standard VEG S2 applies to all vegetation management[48] projects that regenerate[37] timber, except for fuel treatment[13] projects within the wildland urban interface (WUI)[49] as defined by HFRA, subject to the following limitation: Fuel treatment projects within the WUI[49] that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 6 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest). For fuel treatment projects within the WUI[49] see guideline VEG G10. The Standard: Timber management projects shall not regenerate[37] more than 15 percent of lynx habitat on NFS lands in an LAU in a ten-year period.	Applies and is met. The salvage units are considered clearcut regeneration harvests. Under Alternative 2, LAUs 28 would have 9% of lynx habitat affected, LAUs 18 and 30 would affect 8% of lynx habitat, and LAU 36 would affect 6% of lynx habitat. See Table 33 in the Wildlife Report. Past harvest includes completed and ongoing roadside salvage project. None of the LAUs would exceed 15% regeneration harvest of lynx habitat within 10 years.
Guideline VEG G11 – Denning habitat	Denning habitat includes mature to old growth forests with plenty of coarse

Northern Rockies Lynx Management Direction	Is direction applicable to this project and has it been met (Yes or No and Met or Not Met)? Where direction is applicable but has not been met, explain the reason(s).
Denning habitat[6] should be distributed in each LAU in the form of pockets of large amounts of large woody debris, either down logs or root wads, or large piles of small wind thrown trees ("jack-strawed" piles). If denning habitat appears to be lacking in the LAU, then projects should be designed to retain some coarse woody debris[4], piles, or residual trees to provide denning habitat[6] in the future.	woody debris or younger stands with piles of coarse woody debris or areas where trees are jackstrawed. Units to be salvaged are dominated by dead and dying lodgepole pine and would lack the live canopy to moderate weather or intercept snow. Retained trees of other species (Douglas-fir, aspen, spruce and subalpine fir) as well as all trees (live or dead) >15" d.b.h. would still result in fairly open stands. Because no more than 9% of the mapped lynx habitat would be salvaged in any LAU, other mapped lynx habitat would continue to provide some level of denning habitat, especially in mixed stands where dead lodgepole will eventually fall and provide downed woody debris with an overstory canopy of other species.
Standard VEG S5 – Precommercial thinning limits Standard VEG S5 applies to all precommercial thinning[35] projects, except for fuel treatment[13] projects that use precommercial thinning as a tool within the wildland urban interface (WUI)[49] as defined by HFRA, subject to the following limitation: Fuel treatment projects within the WUI[49] that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 6 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest). For fuel treatment projects within the WUI[49] see guideline VEG G10. The Standard: Precommercial thinning projects that reduce snowshoe hare habitat, may occur from the stand initiation structural stage[44] until the stands no longer provide winter snowshoe hare habitat only: 1. Within 200 feet of administrative sites, dwellings, or outbuildings; or 2. For research studies[38] or genetic tree tests evaluating genetically improved reforestation stock; or Based on new information that is peer reviewed and accepted by the regional	Applies. Both action alternatives have been modified to drop the more recent harvest areas and mitigation has been added to retain full-crowned trees with green branches within one foot of the ground. This would retain those trees that are providing cover or forage for snowshoe hares during the winter. However, field review conducted in 2012 shows that two units (36P and 39P) contain suitable snowshoe hare habitat. Precommercial thinning as proposed within these units would reduce suitable snowshoe hare habitat. Therefore, the action alternatives do not meet this standard.

Northern Rockies Lynx Management Direction	Is direction applicable to this project and has it been met (Yes or No and Met or Not Met)? Where direction is applicable but has not been met, explain the reason(s).
levels of the Forest Service and FWS, where a written determination states: that a project is not likely to adversely affect lynx; or that a project is likely to have short term adverse effects on lynx or its habitat, but would result in long-term benefits to lynx and its habitat; or 4. For conifer removal in aspen, or daylight thinning[5] around individual aspen trees, where aspen is in decline; or 5. For daylight thinning of planted rust-resistant white pine where 80 % of the winter snowshoe hare habitat[50] is retained; or 6. To restore whitebark pine.	
Standard VEG S6 – Multi-storied stands & snowshoe hare horizontal cover Standard VEG S6 applies to all vegetation management[48] projects that regenerate[37] timber, except for fuel treatment[13] projects within the wildland urban interface (WUI)[49] as defined by HFRA, subject to the following limitation: Fuel treatment projects within the WUI[49] that do not meet Standards VEG S1, VEG S2, VEG S5, and VEG S6 may occur on no more than 6 percent (cumulatively) of lynx habitat on each administrative unit (a unit is a National Forest). For fuel treatment projects within the WUI[49] see guideline VEG G10. The Standard: Vegetation management projects that reduce snowshoe hare habitat in multi-story mature or late successional forests[29] may occur only: Within 200 feet of administrative sites, dwellings, outbuildings, recreation sites, and special use permit improvements, including infrastructure within permitted ski area boundaries; or 2. For research studies[38] or genetic tree tests evaluating genetically improved reforestation stock; or 3. For incidental removal during salvage harvest[41] (e.g. removal due to location of skid trails).	Stands to be salvaged are dominated by lodgepole pine and are not multi-storied stands. They are characterized by having very poorly developed understories and lack horizontal cover. Stands where commercial thinning and seed tree treatment is proposed are in dry Douglas-fir or ponderosa pine stands that generally lack multi-storied canopy and horizontal diversity. Therefore, commercial treatments meet this standard under both action alternatives. Preliminary review of prescribed burn units indicates that suitable snowshoe hare habitat may occur within Unit 5B. Additional field review is necessary to verify conditions for snowshoe hares within this unit. If suitable habitat is verified within Unit 5B, then proposed prescribed burn treatments may reduce snowshoe hare habitat.

Northern Rockies Lynx Management Direction	Is direction applicable to this project and has it been met (Yes or No and Met or Not Met)? Where direction is applicable but has not been met, explain the reason(s).
(NOTE: Timber harvest is allowed in areas that have potential to improve winter snowshoe hare habitat but presently have poorly developed understories that lack dense horizontal cover [e.g. uneven age management systems could be used to create openings where there is little understory so that new forage can grow]).	
Guideline VEG G1 – Lynx habitat improvement Vegetation management[48] projects should be planned to recruit a high density of conifers, hardwoods, and shrubs where such habitat is scarce or not available. Priority should be given to stem-exclusion, closed-canopy structural stage[44] *stands for lynx or their prey (e.g. mesic, monotypic lodgepole stands).* Winter snowshoe hare habitat[50] should be near denning habitat[6].	Not applicable.
Guideline VEG G4 – Prescribed Fire Prescribed fire[34] activities should not create permanent travel routes that facilitate snow compaction. Constructing permanent firebreaks on ridges or saddles should be avoided.	Not applicable.
Guideline VEG G5 – Habitat for alternate prey species Habitat for alternate prey species, primarily red squirrel[36], should be provided in each LAU.	Habitat for red squirrels is being affected by mountain pine beetle mortality. Mixed conifer stands will be less affected and will continue to provide habitat.
Guideline VEG G10 – Fuel treatments in the WUI *Fuel treatment projects in the WUI*[49] *as defined by HFRA*[17, 48] *should be designed considering standards VEG S1, S2, S5, and S6 to promote lynx conservation.*	Not applicable.
LIVESTOCK MANAGEMENT (GRAZ) T*he following objectives and guidelines apply to grazing projects in lynx habitat in lynx analysis units (LAU). They do not apply to linkage areas.*	Not applicable, this is not a grazing project.
Guideline GRAZ G1 – Livestock grazing and openings In fire- and harvest-created openings, livestock grazing should be managed so impacts do not prevent shrubs and trees from regenerating.	
Guideline GRAZ G2 – Livestock grazing and aspen	

Northern Rockies Lynx Management Direction	Is direction applicable to this project and has it been met (Yes or No and Met or Not Met)? Where direction is applicable but has not been met, explain the reason(s).
In aspen stands, livestock grazing should be managed to contribute to the long-term health and sustainability of aspen.	
Guideline GRAZ G3 – Livestock grazing and riparian areas & willow carrs In riparian areas[40] and willow carrs[3], livestock grazing should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages[28] , similar to conditions that would have occurred under historic disturbance regimes.	
Guideline GRAZ G4 – Livestock grazing and shrub-steppe habitats In shrub-steppe habitats[42], livestock grazing should be managed in the elevation ranges of forested lynx habitat in LAUs[21], to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.	
HUMAN USE PROJETS (HU) The following objectives and guidelines apply to *human use projects, such as special uses (other than grazing), recreation management, roads, highways, mineral and energy development, in lynx habitat in lynx analysis units (LAU),* subject to valid existing rights. *They do not apply to vegetation management projects or grazing projects directly. They do not apply to linkage areas.*	
Guideline HU G1 – Ski area expansion & development, inter-trail islands When developing or expanding ski areas, provisions should be made for adequately sized inter-trail islands that include coarse woody debris[4], so winter snowshoe hare habitat[49] is maintained.	Not applicable.
Guideline HU G2 – Ski are expansion & development, foraging habitat When developing or expanding ski areas, foraging should be provided consistent with the ski area's operational needs, especially where lynx habitat occurs as narrow bands of coniferous forest across mountain slopes.	Not applicable.
Guideline HU G3 – Recreation developments Recreation developments and operations should be planned in ways that both provide for lynx movement and maintain the effectiveness of lynx habitat[23].	Not applicable.

Northern Rockies Lynx Management Direction	Is direction applicable to this project and has it been met (Yes or No and Met or Not Met)? Where direction is applicable but has not been met, explain the reason(s).
Guideline HU G4 – Mineral & energy development For mineral and energy development sites and facilities, remote monitoring should be encouraged to reduce snow compaction.	Not applicable.
Guideline HU G5 – Mineral & energy development, habitat restoration For mineral and energy development sites and facilities that are closed, a reclamation plan that restores[39] lynx habitat should be developed.	Not applicable.
Guideline HU G6 – Roads, upgrading Methods to avoid or reduce effects to lynx should be used in lynx habitat when upgrading unpaved roads to maintenance levels 4 or 5, if the result would be increased traffic speeds and volumes, or a foreseeable contribution to increases in human activity or development.	No road maintenance levels would increase to level 4 or 5.
Guideline HU G7 – Roads, locations New permanent roads should not be built on ridge-tops and saddles, or in areas identified as important for lynx habitat connectivity[16]. New permanent roads and trails should be situated away from forested stringers.	Not applicable.
Guideline HU G8 – Roads, brushing Cutting brush along low-speed[25], low-traffic-volume roads should be done to the minimum level necessary to provide for public safety.	Not applicable.
Guideline HU G9 – Roads, new On new roads built for projects, public motorized use should be restricted. Effective closures should be provided in road designs. When the project is over, these roads should be reclaimed or decommissioned, if not needed for other management objectives.	Applicable. New temporary roads will be closed to public use during project activities and subsequently decommissioned. New FS system road totaling 1.26 mi. will be closed to public use.
Guideline HU G10 – Roads, ski area access *When developing or expanding ski areas and trails, access roads and lift termini to maintain and provide lynx security[10] habitat.*	Not applicable.
Guideline HU G11 – Snow compaction Designated over-the-snow routes, or designated play areas, should not expand outside baseline areas of consistent snow compaction[1], unless designation serves	Not applicable.

Northern Rockies Lynx Management Direction	Is direction applicable to this project and has it been met (Yes or No and Met or Not Met)? Where direction is applicable but has not been met, explain the reason(s).
to consolidate use and improve lynx habitat. This is calculated on an LAU basis, or on a combination of immediately adjacent LAUs. This does not apply inside permitted ski area boundaries, to winter logging, to rerouting trails for public safety, to accessing private inholdings, or to access regulated by Guideline HU G12. Use the same analysis boundaries for all actions subject to this guideline.	
Guideline HU G12 – Winter access for non-recreation SUP & mineral & energy development Winter access for non-recreation special uses, and mineral and energy exploration and development, should be limited to designated routes[8] or designated over-the-snow routes[7].	Not applicable.
LINKAGE AREAS (LINK) The following objective, standard and guidelines apply to *all projects within linkage areas,* subject to valid existing rights.	
Standard LINK S1 – Highway or forest highway construction in linkage areas When highway[18] or forest highway[12] construction or reconstruction is proposed in linkage areas[22], identify potential highway crossings.	Not applicable
Guideline LINK G1 – Land exchanges NFS lands should be retained in public ownership.	Not applicable
Guideline LINK G2 – Livestock grazing in shrub-steppe habitats *Livestock grazing in shrub-steppe habitats[42] should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages[28], similar to conditions that would have occurred under historic disturbance regimes.*	Not applicable

Glossary

[1] *Areas of consistent snow compaction* – An area of consistent snow compaction is an area of land or water that during winter is generally covered with snow and gets enough human use that individual tracks are indistinguishable. In such places, compacted snow is evident most of the time, except immediately after (within 48 hours) snowfall. These can be areas or linear routes, and are generally found in near snowmobile or cross-country ski routes, in adjacent openings, parks and meadows, near ski huts or plowed roads, or in winter parking areas. Areas of consistent snow compaction will be determined based on the area or miles used in 1998 to 2000.

[2] *Broad scale assessment* – A broad scale assessment is a synthesis of current scientific knowledge, including a description of uncertainties and assumptions, to provide an understanding of past and present conditions and future trends, and a characterization of the ecological, social and economic components of an area. (LCAS)

[3] *Carr* – Deciduous woodland or shrub land occurring on permanently wet, organic soil. (LCAS)

[4] *Course woody debris* – Any piece(s) of dead woody material, e.g., dead boles, limbs, and large root masses on the ground or in streams. (LCAS)

[5] *Daylight thinning* – Daylight thinning is a form of precommercial thinning that removes the trees and brush inside a given radius around a tree.

[6] *Denning habitat (lynx)* – Denning habitat is the environment lynx use when giving birth and rearing kittens until they are mobile. The most common component is large amounts of coarse woody debris to provide escape and thermal cover for kittens. Denning habitat must be within daily travel distance of winter snowshoe hare habitat – the typical maximum daily distance for females is about three to six miles. Denning habitat includes mature and old growth[24] forests with plenty of coarse woody debris. It can also include young regenerating forests with piles of coarse woody debris, or areas where down trees are jack-strawed.

[7] *Designated over-the-snow routes* – Designated over-the-snow routes are routes managed under permit or agreement or by the agency, where use is encouraged, either by on-the-ground marking or by publication in brochures, recreation opportunity guides or maps (other than travel maps) or in electronic media produced or approved by the agency. The routes identified in outfitter and guide permits are designated by definition; groomed routes also are designated by definition. The determination of baseline snow compaction will be based on the miles of designated over-the-snow routes authorized, promoted or encouraged in 1998 to 2000.

[8] *Designated route* – A designated route is a road or trail that has been identified as open for specified travel use.

[9] *Developed recreation* – Developed recreation requires facilities that result in concentrated use. For example, skiing requires lifts, parking lots, buildings and roads; campgrounds require roads, picnic tables and toilet facilities.

[10] *Security habitat (lynx)* – Security habitat amounts to places in lynx habitat that provide secure winter bedding sites for lynx in highly disturbed landscapes like ski areas. Security habitat gives lynx the ability to retreat from human disturbance. Forest structures that make human access difficult generally discourage human activity in security habitats. Security habitats are most effective if big enough to provide visual and acoustic insulation and to let lynx easily move away from any intrusion. They must be close to winter snowshoe hare habitat. (LCAS)

[11] *Fire use* – Fire use is the combination of wildland fire use and using prescribed fire to meet resource objectives. (NIFC) Wildland fire use is the management of naturally ignited wildland fires to accomplish resource management objectives in areas that have a fire management plan. The use of the term wildland fire use replaces the term prescribed natural fire. (Wildland and Prescribed Fire Management Policy, August 1998)

[12] *Forest highway* – A forest highway is a forest road under the jurisdiction of, and maintained by, a public authority and open to public travel (USC: Title 23, Section 101(a)), designated by an agreement with the FS, state transportation agency and Federal Highway Administration.

[13] *Fuel treatment* – A fuel treatment is a management action that reduces the threat of ignition and fire intensity or rate of spread, or is used to restore fire-adapted ecosystems.

[14] *Goal* – A goal is a broad description of what an agency is trying to achieve, found in a land management plan. (LCAS)

[15] *Guideline* – A guideline is a particular management action that should be used to meet an objective found in a land management plan. The rationale for deviations may be documented, but amending the plan is not required. (LCAS modified)

[16] *Habitat connectivity (lynx)* – Habitat connectivity consists of an adequate amount of vegetation cover arranged in a way that allows lynx to move around. Narrow forested mountain ridges or shrub-steppe plateaus may serve as a link between more extensive areas of lynx habitat; wooded riparian areas may provide travel cover across open valley floors. (LCAS)

[17] *HFRA (Healthy Forests Restoration Act)* - Public Law 108-148, passed in December 2003. The HFRA provides statutory processes for hazardous fuel reduction projects on certain types of at-risk National Forest System and Bureau of Land Management lands. It also provides other authorities and direction to help reduce hazardous fuel and restore healthy forest and rangeland conditions on lands of all ownerships. (Modified from Forest Service HFRA web site.)

[18] *Highway* – The word highway includes all roads that are part of the National Highway System. (23 CFR 470.107(b))

[19] *Horizontal cover* – Horizontal cover is the visual obscurity or cover provided by habitat structures that extend to the ground or snow surface primarily provided by tree stems and tree boughs, but also includes herbaceous vegetation, snow, and landscape topography. Horizontal cover was measured by John Squires et al. (pers. com.) in Northwestern Montana according to the following methodology:

"A canvas cover-board (2 m x 0.5 m) was erected 10 m from plot center in 4 directions (forward track, back track, and at 2, 90° angles) was read to directly measure horizontal cover. The cover board was divided into 4, 0.5 meter blocks and each block was further dividend into quarters. At each reading, technicians estimated horizontal cover by 10% class at each of the 4 heights; these 4 estimates were then averaged for an overall estimate of that reading." (According to Squires via pers. com., cover measured during the summer period averaged approximately 65% while at den sites it was measured at roughly 85%. During the winter period cover was measured at 45% while at winter kill sites it was slightly greater than 50%.)

[20] *Isolated mountain range* – Isolated mountain ranges are small mountains cut off from other mountains and surrounded by flatlands. On the east side of the Rockies, they are used for analysis instead of sub-basins. Examples are the Little Belts in Montana and the Bighorns in Wyoming.

[21] *LAU (Lynx Analysis Unit)* – An LAU is an area of at least the size used by an individual lynx, from about 25 to 50 square miles (LCAS). An LAU is a unit for which the effects of a project would be analyzed; its boundaries should remain constant.

[22] *Linkage area* – A linkage area provides connectivity between blocks of lynx habitat. Linkage areas occur both within and between geographic areas, where basins, valleys or agricultural lands separate blocks of lynx habitat, or where lynx habitat naturally narrows between blocks. (LCAS updated definition approved by the Steering Committee 10/23/01)

[23] *Lynx habitat* – Lynx habitat occurs in mesic coniferous forest that experience cold, snowy winters and provide a prey base of snowshoe hare. In the northern Rockies, lynx habitat is generally occurs between 3,500 and 8,000 feet of elevation, and primarily consists of lodgepole pine, subalpine fir and Engelmann spruce. It may consist of cedar-hemlock in extreme northern Idaho, northeastern Washington and northwestern Montana, or of Douglas fir on moist sites at higher elevations in central Idaho. It may also consist of cool, moist Douglas fir, grand fir, western larch and aspen when interspersed in subalpine forests. Dry forests do not provide lynx habitat. (LCAS)

[24] *Lynx habitat in an unsuitable condition* –Lynx habitat in an unsuitable condition consists of lynx habitat in the stand initiation structural stage where the trees are generally less than ten to 30 years old and have not grown tall enough to protrude above the snow during winter. Stand replacing fire or certain vegetation management projects can create unsuitable conditions. Vegetation management projects that can result in unsuitable habitat include clearcuts and seed tree harvest, and sometimes shelterwood cuts and commercial thinning depending on the resulting stand composition and structure. (LCAS)

[25] *Low-speed, low-traffic-volume road* – Low speed is less than 20 miles per hour; low volume is a seasonal average daily traffic load of less than 100 vehicles per day.

[26] *Maintain* – In the context of this amendment, maintain means to provide enough lynx habitat to conserve lynx. It does not mean to keep the status quo.

[27] *Maintenance level* – Maintenance levels define the level of service provided by and maintenance required for a road. (FSH 7709.58, Sec 12.3) Maintenance level 4 is assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most level 4 roads have double lanes and aggregate surfaced. Some may be single lane; some may be paved or have dust abated. Maintenance level 5 is assigned to roads that provide a high degree of user comfort and convenience. Normally, roads are double-lane and paved, but some may be aggregate surfaced with the dust abated.

[28] *Mid-seral or later* – Mid-seral is the successional stage in a plant community that's the midpoint as it moves from bare ground to climax. For riparian areas, it means willows or other shrubs have become established. For shrub-steppe areas, it means shrubs associated with climax are present and increasing in density.

[29] *Multi-story mature or late successional forest* – This stage is similar to the *old multistory structural stage (see below)*. However, trees are generally not as old and decaying trees may be somewhat less abundant.

[30] *Objective* – An objective is a statement in a land management plan describing desired resource conditions and intended to promote achieving programmatic goals. (LCAS)

[31] *Old multistory structural stage* – Many age classes and vegetation layers mark the old forest, multistoried stage. It usually contains large old trees. Decaying fallen trees may be present that leave a discontinuous overstory canopy. On cold or moist sites without frequent fires or other disturbance, multi-layer stands with large trees in the uppermost layer develop. (Oliver and Larson, 1996)

[32] *Old growth* – Old growth forests generally contain trees that are large for their species and site, and are sometimes decadent with broken tops. Old growth often contains a variety of tree sizes, large snags and logs, and a developed and often patchy understory.

[33] *Permanent development* – A permanent development is any development that results in a loss of lynx habitat for at least 15 years. Ski trails, parking lots, new permanent roads, structures, campgrounds and many special use developments would be considered permanent developments.

[34] *Prescribed fire* – A prescribed fire is any fire ignited as a management action to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements met, before ignition. The term replaces management ignited prescribed fire. (NWCG)

[35] *Precommercial thinning* – Precommercial thinning is mechanically removing trees to reduce stocking and concentrate growth on the remaining trees, and not resulting in immediate financial return. (Dictionary of Forestry)

[36] *Red squirrel habitat* – Red squirrel habitat consists of coniferous forests of seed and cone-producing age that usually contain snags and downed woody debris, generally associated with mature or older forests.

[37]*Regeneration harvest* – The cutting of trees and creating an entire new age class; an even-age harvest. The major methods are clearcutting, seed tree, shelterwood, and group selective cuts (Helms 1998).

[38] *Research* – Research consists of studies conducted to increase scientific knowledge or technology. For the purposes of Standards VEG S5 and VEG S6, research applies to studies financed from the forest research budget (FSM 4040) and administrative studies financed from the NF budget.

[39] *Restore, restoration* – To restore is to return or re-establish ecosystems or habitats to their original structure and species composition. (Dictionary of Forestry)

[40] *Riparian area* – An area with distinctive soil and vegetation between a stream or other body of water and the adjacent upland; includes wetlands and those portions of floodplains and valley bottoms that support riparian vegetation. (LCAS)

[41] *Salvage harvest* – Salvage harvest is a commercial timber sale of dead, damaged or dying trees. It recovers economic value that would otherwise be lost. Collecting firewood for personal use is not considered salvage harvest.

[42] *Shrub steppe habitat* – Shrub steppe habitat consists of dry sites with shrubs and grasslands intermingled.

[43] *Standard* – A standard is a required action in a land management plan specifying how to achieve an objective or under what circumstances to refrain from taking action. A plan must be amended to deviate from a standard.

[44] *Stand initiation structural stage* – The stand initiation stage generally develops after a stand-replacing disturbance by fire or regeneration timber harvest. A new single-story layer of shrubs, tree seedlings and saplings establish and develop, reoccupying the site. Trees that need full sun are likely to dominate these even-aged stands. (Oliver and Larson, 1996)

[45] *Stem exclusion structural stage* – In the stem exclusion stage, trees initially grow fast and quickly occupy all of the growing space, creating a closed canopy. Because the trees are tall, little light reaches the forest floor so understory plants (including smaller trees) are shaded and grow more slowly. Species that need full sunlight usually die; shrubs and herbs may become dormant. New trees are precluded by a lack of sunlight or moisture. (Oliver and Larson, 1996)

[46] *Timber management* – Timber management consists of growing, tending, commercially harvesting and regenerating crops of trees.

[47] *Understory re-initiation structural stage* – In the understory re-initiation stage, a new age class of trees gets established after overstory trees begin to die, are removed or no longer fully occupy their growing space after tall trees abrade each other in the wind. Understory seedlings then re-grow and the trees begin to stratify into vertical layers. A low to moderately dense uneven-aged overstory develops, with some small shade-tolerant trees in the understory. (Oliver and Larson, 1996)

[48] *Vegetation management projects* – Vegetation management projects change the composition and structure of vegetation to meet specific objectives, using such means as prescribed fire and timber harvest. For the purposes of this amendment, the term does not include removing vegetation for permanent developments like mineral operations, ski runs, roads and the like, and does not apply to fire suppression or to wildland fire use.

[49] *Wildland urban interface (WUI)* - The area adjacent to an at-risk community that is identified in the community wildfire protection plan. If there is no community wildfire protection plan in place, the WUI is the area 0.5 mile from the boundary of an at-risk community or within 1.5 miles of the boundary of an at-risk community. The WUI could also include areas if the terrain is steep, or there is a nearby road or ridge top that could be incorporated into a fuel break, or the land is in condition class 3, or the area contains an emergency exit route needed for safe evacuations. (Condensed from HFRA. For full text see HFRA § 101.)

[50] *Winter snowshoe hare habitat* – Winter snowshoe hare habitat consists of places where young trees or shrubs grow dense – thousands of woody stems per acre – and tall enough to protrude above the snow during winter, so hares can browse on the bark and small twigs (Ruediger et al. 2000). Winter snowshoe hare habitat develops primarily in the stand initiation, understory reinitiation and old forest multistoried structural stage.